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JOURNAL OF ARIZONA

MEDICAL ASSOCIATION

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UNITED STATES AND MEXICO

Volume 17

Number 12

December, 1960

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Vol. 17, No. 12

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References: 1. Pitts, R. F., *Am. J. Med.*, 24:745, 1958. 2. Ford, R. V., *Cur. Therap. Res.*, 2:51, 1960.

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Original Articles

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The Use of Electrophoresis in Clinical Medicine

Maurice Rosenthal, M.D.

Mary L. Wagner, B.S.

The authors have succeeded admirably in their attempts "... to present a concise and critical resume of the use of electrophoresis in clinical medicine with special reference to its most advantageous diagnostic and prognostic usage." The Bibliography is excellent. It is unusual to see bibliographic reference to THE YEAR BOOK OF MEDICINE, but here it is exemplary.

C.L.R.

THIS article has been compiled from pertinent literature and results of over 7,500 electrophoretograms done in our laboratory.* Its aim is to present to the practicing physician a summary of the usage of paper electrophoresis in clinical medicine.

With the exception of hypogammaglobulinemia, multiple myeloma, the nephrotic syndrome and uncomplicated cirrhosis, electrophoretograms are not, in themselves, diagnostic. However, in many instances the protein patterns will exhibit some characteristic deviations which may be of diagnostic or prognostic value when

considered with the patient's clinical history and physical findings.

HYPOGAMMAGLOBULINEMIA AND AGAMMAGLOBULINEMIA

Hypogammaglobulinemia is a condition characterized by inadequate production of antibodies, rendering the patient susceptible to numerous infectious diseases, especially upper respiratory infections which respond poorly, if at all, to antibiotic therapy. Hypogammaglobulinemia may occur in children and adults. The disease appears to be both hereditary and acquired.

Agammaglobulinemia is a rare condition in which the gamma globulin and subsequently the

*The Diagnostic Laboratory, Phoenix, Arizona. An Ivan Sorvall horizontal paper electrophoresis apparatus was used employing a barbital buffer, pH 8.8, ionic strength 0.075 with a migration time of 18 hours at 2.5-3 mA. Calculations were made with a Spinco Model RB Analytrol and total proteins were done refractometrically.

disease fighting antibodies are almost completely lacking. Minute traces of gamma globulin are electrophoretically demonstrable by some methods in this disease. In over 7,500 electrophoretic studies in our laboratory only five cases of agammaglobulinemia have been encountered.

Since the gamma globulin fraction is a composite of many proteins and protein antibody fractions, many of which are unknown, the value of the gamma globulin obtained by an electrophoretic pattern must be closely coordinated with the evaluation of the patient's clinical history. A very slight decrease of gamma globulin does not necessarily imply that the patient is lacking antibodies, unless the clinical picture supports this point of view. Conversely, a normal gamma globulin does not presuppose a sufficient antibody response. However, electrophoretic studies in hypogammaglobulinemia have shown sufficient decreases of the gamma globulin to be useful as a rough estimate of the severity of the disease and its response to therapy.

PROTEIN DEVIATIONS IN INFECTION AND INFLAMMATION

Perhaps the most common protein deviations encountered are those which are consistent with infectious and inflammatory processes. An increased alpha-II globulin is characteristic in these protein patterns and is usually, except in mild inflammation or infection, accompanied by an albumin decrease. Depending upon the severity of the process, the beta globulin decreases, the gamma globulin may increase and the A/G ratio may become inverse.

Among the infectious and inflammatory diseases in which electrophoretograms have proved of value are pulmonary tuberculosis, syphilis, and active ulcerative colitis.

In pulmonary tuberculosis it has been found that a progressive decrease of albumin, along with a progressive increase of alpha-II globulin, is indicative of the increasing activity and extent of the disease. As the disease becomes quiescent, or is brought under control with anti-tuberculosis drugs, these fractions return to normal. Gilliland, Johnson, et al.(1) consider the serum protein changes to be a far more sensi-

tive index than the conventionally used sedimentation rate.

Electrophoretic patterns in syphilis exhibit an albumin decrease and an increase of the alpha-II and gamma globulin fractions. Successful treatment of the disease returns these fractions to normal(2), thus providing an indication of the patient's progress under treatment.

In active ulcerative colitis the protein changes are consistent with those found in severe inflammation. Case studies(3) indicate that the protein changes exhibit a quantitative variation with the severity of the disease.

Space does not permit the recording of the utilization of electrophoretograms in all of the pathological conditions of an infectious or inflammatory nature. Only a few representative diseases have been cited in order to convey some idea of the usage of electrophoretograms in following the progression of these disorders.

KIDNEY DISEASES

Glomerulonephritis and pyelonephritis do not produce diagnostic electrophoretograms. However, renal pathologic changes of either type characteristically exhibit an albumin decrease and an alpha globulin increase. The beta and gamma globulins may be normal, slightly increased or decreased. When glomerulonephritis progresses into the nephrotic syndrome a diagnostic protein pattern emerges. The albumin decrease becomes more severe, the beta and gamma globulins steadily decrease, and the alpha globulins comprise an increasingly larger percentage of the total protein. In terminal cases the total protein has been seen to fall as low as 1.5-2.0 gm. % with the alpha globulins constituting 40-60% of the total protein.

Lipoid nephrosis exhibits essentially the same protein changes seen in the nephrotic syndrome. However, lipoid nephrosis may usually be distinguished by a relative increase of beta globulin.(4)

The serum protein pattern of uremia is consistent with those found in the infectious and inflammatory processes previously described. An increase of alpha II globulin always accompan-

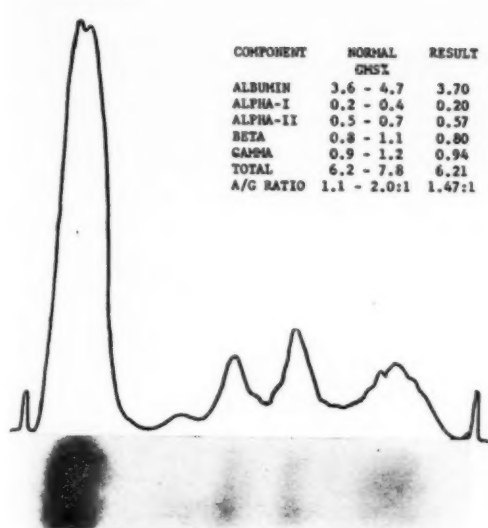


FIGURE 1 NORMAL: This pattern is representative of average normal protein patterns. The graph is a reproduction of the actual analytrol graph obtained from the stained protein pattern. The 1 cm. peaks preceding the albumin and following the gamma globulin are made to insure correlation between the graph and strip.

1.

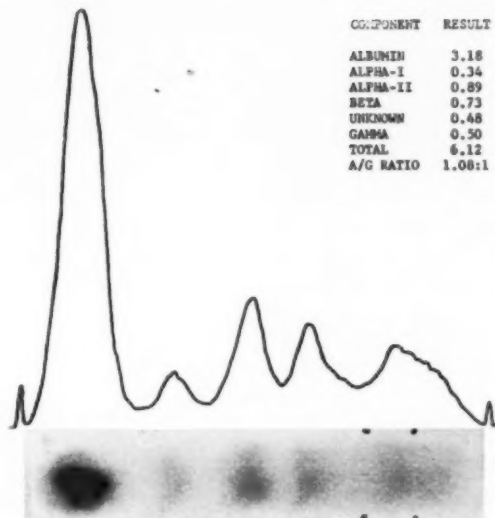


FIGURE 7 UNKNOWN PROTEIN: The abnormal protein in this pattern exhibits the migration characteristics of a myeloma protein. Intensive study of this patient ruled out myeloma, cryo- and pyro-globulins. This unclassified abnormal protein illustrates the possibility of erroneous interpretation of an electrophoretogram exhibiting small amounts of abnormal protein.

2.

ies this condition and it has been theorized that the alpha II globulin increase is due to pathological changes of the renal parenchyma. Increase of alpha II globulin, non-protein nitrogen and creatinine are apparently co-existent.(5)

In the kidney diseases alleviation of inflammation and subsequent tissue repair is heralded by a reversion of the protein fractions toward normal. In this respect electrophoretograms may be considered as valuable as any other kidney function test in following the regression of the disease.

LIVER DISEASES

In liver disease electrophoretograms may, at times, reveal as much or more than a battery of liver function tests. In hepatocellular damage the albumin and one or both of the alpha globulin fractions will be decreased. In all other diseases associated with an albumin decrease, the alpha globulins will be normal or increased(6). (We have found that this pattern may occur when clinical manifestations of hepatocellular damage are practically negligible.)

Electrophoretic patterns which may aid in the differentiation of liver disease are those found in cirrhosis, xanthomatous biliary cirrhosis, fatty liver, viral hepatitis, cholelithiasis, cholecystitis, and cholestasis.

Laennec's cirrhosis produces a striking electrophoretogram which may well be considered diagnostic. The albumin and beta globulin fractions are moderately to markedly decreased; the alpha globulins are decreased; the gamma globulin shows a moderate to marked increase and the A/G ratio is inverse. In the stained protein pattern the beta and gamma globulins are practically fused together, due to the increase of lipoproteins, and the entire pattern shows a characteristic tear-drop shape(7-8).

The acute hepatocellular degeneration associated with many other liver diseases produces a pattern similar to that of cirrhosis; the protein aberrations may vary slightly and the pattern may or may not exhibit a tear-drop shape. Xanthomatous biliary cirrhosis may be distinguished by an increased beta globulin. In this disease the beta globulin has been seen to increase up

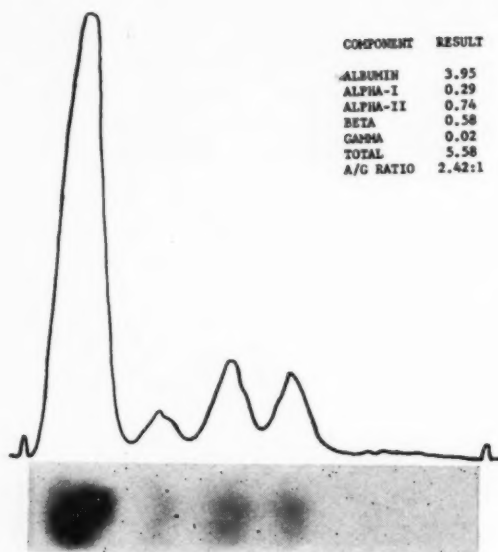


FIGURE 2 AGAMMAGLOBULINEMIA: Electrophoretic studies were made on this adult female patient for several years. Her response to gamma globulin therapy was poor and a satisfactory serum gamma globulin level was never maintained. This patient eventually succumbed to the many infectious processes to which she was subject.

3.

to 1.7 gm.%(6). A beta globulin increase may also occur in fatty liver. In the cirrhotic stage fatty liver reveals the protein pattern of cirrhosis but again the beta globulin shows higher levels than in cirrhosis alone.

The alpha globulins, especially the alpha II globulin, are increased in viral hepatitis, superimposing a pattern of infection and inflammation over the usual protein changes produced by the liver disease. In the presence of jaundice this pattern is suggestive, but cannot be considered as conclusive. Cholelithiasis, cholecystitis and cholestasis may also present patterns of this same general configuration. In the latter diseases, if the toxic hepatic injury is slight and the necrotic tissue areas are small, the electrophoretograms will yield patterns of the inflammatory type; but if the hepatic injury is more extensive, the electrophoretic pattern will be indistinguishable from that of hepatitis. In hepatic disorders due to extra-hepatic biliary obstruction, mechanical injury, or infection, the alpha globulins may be elevated. In the case of biliary obstruction the elevated alpha globulins may be

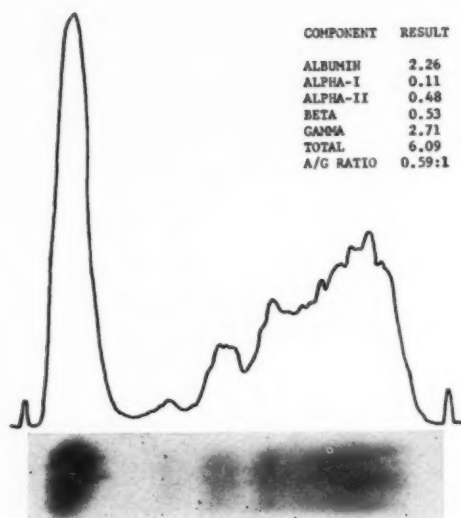


FIGURE 5 CIRRHOSIS: This pattern is typical of the protein aberrations due to the severe hepatocellular damage occurring in cirrhosis. Note the decrease of albumin and alpha globulin fractions and the marked increase of gamma globulin which is characteristic of liver cell damage. In the stained protein pattern the fusion of the beta and gamma globulins is due to an increase of lipoproteins.

4.

the only change occurring in the protein pattern. In obstruction where the hepato-cellular damage is slight, no significant changes in the serum proteins are seen and a normal pattern may occur(7).

The evaluation of the gamma globulin fraction in an electrophoretogram is of more prognostic value than other liver function tests. Normally the liver produces very little gamma globulin, but in liver dyscrasias the stimulation of the hepatic mesenchyme, or stimulation of extra-hepatic mesenchyme by hepatic cell breakdown products, causes an abnormal increase of gamma globulin. This abnormal production of gamma globulin is proportional to the degree of tissue damage and a marked hypergammaglobulinemia in hepatic disease signifies a poor prognosis(7).

The gamma globulin fraction may also be indicative of more severe manifestations occurring as a complication in the liver diseases in which hepatocellular damage is usually slight. Hepatic obstruction does not usually produce an increase of gamma globulin unless accompanied by a

moderate degree of liver cell damage. The transition of viral hepatitis into cirrhosis may be heralded by a persistent increase of gamma globulin after other liver survey tests return to normal and the acute clinical symptoms have disappeared(7).

The decreased levels of albumin found in liver diseases are also a measure of hepatocellular damage since the synthesis of this protein occurs in the liver. However, the albumin levels are of far less prognostic value since liver disease is often complicated by loss of albumin associated with ascites, edema and albuminuria.

It must be stressed that in order to utilize an electrophoretic pattern to its best advantage, whether in liver or any other disease, there are some considerations which must be included in the evaluation of an electrophoretogram. Since the general types of patterns into which protein changes must fall are few, the presence of more than one disease or complication will invariably produce a confusing electrophoretogram of obscure significance. For example, congestive heart failure, arteriosclerotic heart disease, the collagen diseases and some liver diseases produce the same general changes in the protein pattern, that is; decreased albumin, increased gamma globulin, and an apparent lipoprotein increase. The A/G ratio is inverse. Slight differences do exist in the protein fractions in these diseases; but when hepatic disorder is suspected in the presence of one of the diseases exhibiting this general pattern, it is impossible to ascertain whether the protein changes are manifested entirely by one disease or are due to the combined action of both diseases. The existence of severe complications or more than one disease will, with few exceptions, usually invalidate the use of electrophoresis as a reliable prognostic or diagnostic tool.

Another factor, which must also be considered, is that not too infrequently a normal gamma globulin may be found in liver disease even in the presence of jaundice. Reported cases of this occurrence include the early phase of acute hepatitis, hepatic amyloidosis, fatty liver in hepatic failure, metastatic carcinoma and lymphoma.

*Our studies of neoplastic diseases correlate with Mider's in one respect. When the alpha globulins are both elevated and the alpha I globulin fraction is increased to 0.5 gm.% or above a neoplastic process was discernible in approximately 80% of the cases exhibiting these protein deviations. However, none of these cases could be classified as early neoplasms.

NEOPLASTIC DISEASES AND ALLIED DISORDERS

Electrophoretic studies did not meet the expectation that they would be of diagnostic value in neoplastic diseases. The primary alterations of the serum protein fractions in neoplastic disorders are decreased albumin and increased alpha and gamma globulins. This pattern represents a common response to many metabolic, infectious and functional disorders. This renders these patterns almost entirely non-specific(9-10). Mider(11) has studied electrophoretic patterns in 258 cases of neoplastic diseases and allied disorders. His studies indicate that patterns with decreased albumin and increased alpha globulins are consistently found in neoplastic diseases*, and that the severity of these protein aberrations increases as the disease progresses. Even though these protein abnormalities are consistent, the existing consensus of opinion is that the prognostic value of electrophoretic patterns is very limited in neoplastic disease. For these protein changes are considered as a measure of the overall status of the patient and cannot be used as a specific measure of solid tumor growth or regression(12).

Electrophoresis has been shown to be of some prognostic value in Hodgkins disease and multiple myeloma. Jones(13) cites cases of multiple myeloma under chemotherapy in which both the clinical condition and the serum proteins were returned to a normal status. Wall(14) and Arends(15) in separate investigations have shown that in Hodgkins disease successful irradiation and chemotherapy or spontaneous remission revert the serum proteins to normal; and that a relapse of inactive Hodgkins disease was heralded by significant increase of the alpha II and gamma globulins. These changes often occurred even before lymph node masses became obvious.

ABNORMAL PROTEIN FRACTIONS

Increasing usage of electrophoresis in clinical medicine has brought about the recognition of several abnormal protein fractions. The abnormal proteins exhibit properties different from the normal protein fractions and have been shown to be the causative factor of some diseases and the effect in others. These abnormal proteins migrate with the globulin fractions, and

are most often seen in the gamma globulin position. Abnormal proteins are demonstrable in electrophoretic patterns and are manifested either as a distinct protein fraction which is distinguishable from the normal globulins (i.e. myeloma protein), or as a consistent non-pathognomonic increase of a normally occurring globulin fraction.

Of these abnormal proteins, the macroglobulins and cryoglobulins have received wide spread attention in the last several years. Increasing evidence indicates that these proteins occur in a large number of disease states. The macroglobulins are technically defined as high molecular weight (1,000,000 or over) globulins possessing an ultracentrifuge S^r constant of 15 or more and usually averaging around 19(16-17). The 19 S^r constant globulins usually migrate with the alpha II and gamma globulins(17). However, the macroglobulins may also occasionally migrate in the beta globulin position(16).

Ultracentrifuge studies have shown that the 19 S^r macroglobulins are normally present in small amounts in human sera ranging from 0.2 gm.% to 0.4 gm.%. Macroglobulinemia is a polyetiologic syndrome which may occur in many diseases. Increased amounts of macroglobulins have been demonstrated in liver cell damage, nephrosis, leukemia, rheumatoid arthritis, carcinoma, lupus erythematosus, and arteriosclerotic heart disease(17). The pathologic manifestations of the macroglobulins in these diseases are not yet known. The only pathological conditions yet described in which the macroglobulins play an important role are the macroglobulenemic purpuras.

"Waldenstroms macroglobulinemia" was the first clinical disease entity described in which the macroglobulins are considered as a causative agent. The disease is characterized by lassitude, dyspnea, and mucosal hemorrhage. Physical examination reveals pallor, edema, painless, slightly enlarged lymph nodes, slight hepatosplenomegaly and epistaxis. Electrophoretic studies reveal a consistent, marked increase of the gamma globulin fraction. Although it is difficult to establish the difference between macrogammaglobulinemia and hypergammaglobulinemia in the electrophoretic pattern, some differences can be discerned which may give an

indication of the nature of the gamma globulin increase. If the macroglobulins are present in clinically significant amounts the gamma globulin fraction in which they migrate will show a discrete peak. If the macroglobulins are not present in significant amounts the gamma globulin peak is broad and not discrete(16-20). Comparisons of patterns, in which macroglobulin increases are known to occur, with patterns exhibiting increased fractions not due to macroglobulins have consistently substantiated this observation.

Since Waldenstrom's hemorrhagic macroglobulinemia has been recognized as a disease entity, many other cases of hemorrhagic diseases associated with macroglobulinemia have been reported(16,18,19,20). Macroglobulinemia may be the cause of many thrombotic, hemorrhagic, and purpuric syndromes which occur during the course of diseases affecting the reticulo-endothelial system.

Henstell(18) and others(16,20) have attempted to prove the mechanism of the syndromes which are characterized by macroglobulinemia. The general consensus is that the macroglobulins interfere with the formation of fibrin by absorbing some of the clotting factors upon the abnormal globulin. Henstell described a thrombo-hemorrhagic-diathesis in which some evidence was given for this theory. It is believed that, in the case of this diathesis, the clotting factors go in and out of combination with the macroglobulins. When the clotting elements are in combination with the macroglobulins, the situation is predominately hemorrhagic. When these clotting elements are released from the combination, the situation is predominantly thrombotic. These observations were supported by laboratory measurements of the clotting factors*.

In the diagnosis of these syndromes, which may either be due to macroglobulinemia or hypergammaglobulinemia(20), ultracentrifuge studies are not always readily obtainable, and since paper electrophoretic separation has been extensively used in the study of these diseases, they have been proven to be a fairly reliable screening test for the presence of macroglobulinemia.

*Henstell's thrombo-hemorrhagic-diathesis is not to be confused with congenital hemorrhagic diathesis. See American Journal of Medicine, Vol. 20, pp. 798-805, 1956.

COMPONENT	RESULT
ALBUMIN	1.99
ALPHA-I	0.19
ALPHA-II	1.42
BETA	0.97
GAMMA	0.45
TOTAL	5.02
A/G RATIO	0.65:1

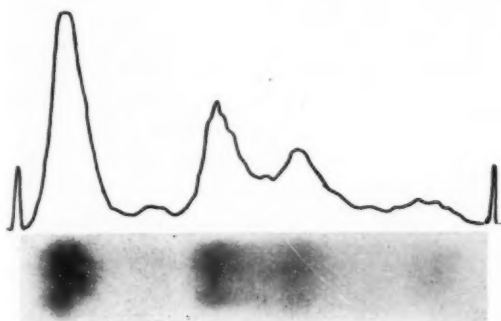


FIGURE 4 NEPHROSIS: This serum pattern is representative of the nephrotic syndrome of glomerular nephritis. An electrophoretic study of the urine was run simultaneously on this patient. The urine electrophoretogram revealed a loss of 1.23 albumin; 0.13 alpha-I globulin; 0.16 beta globulin; and 0.02 gm/100 ml. gamma globulin.

5.

Cryoglobulins are technically defined as globulins precipitated by cold (precipitation occurs around 5°C). Their formation may be related to an immunological process which effects all or part of the gamma globulin. Electrophoretically the cryoglobulins migrate in the gamma position and clinically significant amounts may be demonstrated in the serum protein patterns (16,21).

Cryoglobulinemia is also a polyetiological syndrome which may occur during the course of many diseases. It may be classified as essential cryoglobulinemia in which the underlying cause is obscure, or as secondary cryoglobulinemia in which the formation of the cryoglobulin is related to a known disease. Secondary cryoglobulinemia may occur in multiple myeloma, kala-azar, disseminated lupus erythematosus, coronary artery disease, sub-acute bacterial endocarditis, periarteritis nodosa, rheumatoid arthritis, lymphosarcoma, lymphatic leukemia, polycythemia vera rubra, and hepatic cirrhosis (21).

Some of the clinical manifestations of cryo-

COMPONENT	RESULT
ALBUMIN	1.73
ALPHA-I	0.48
ALPHA-II	0.96
BETA	0.60
GAMMA	2.33
TOTAL	6.10
A/G RATIO	0.39:1

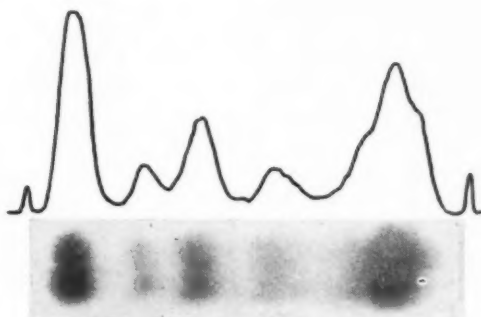


FIGURE 5 MACROGLOBULINEMIA: This macroglobulinemia was discovered in a child with disseminated coccidiomycosis. The distinct peak in the analytrol graph along with the round configuration of the gamma globulin fraction is indicative of a macroglobulin increase. (See text)

6.

globulinemia include cold sensitivity, purpura, nasal and oral hemorrhage, dyspnea, abdominal distress with hepato-splenomegaly, melaena, atypical Raynaud's phenomenon, gangrene of the extremities, mottling of lower extremities, cyanosis, stomatitis, diarrhea, deafness, arterial and venous occlusion; and pulmonary vascular sclerosis may occur due to the deposit of cryoglobulins (16,21,22).

The suspected presence of a cryoglobulin in an electrophoretic pattern may be confirmed by cold precipitation or electrophoretic studies before and after cold precipitation of the cryoglobulins. Quantitation of the cryoglobulin may be achieved by electrophoretic studies before and after cold precipitation or by the "cryocrit" method of Mackley (16). The cryoproteins are not entirely restricted to the globulin fractions. Cases of cryofibrinogenemia have also been reported. (The clinical effects of this disease appear to be primarily thrombotic.)

As early as 1933, Wintrobe (23) accurately described a case of retinal thrombosis and accompanying symptoms of Raynaud's disease. The

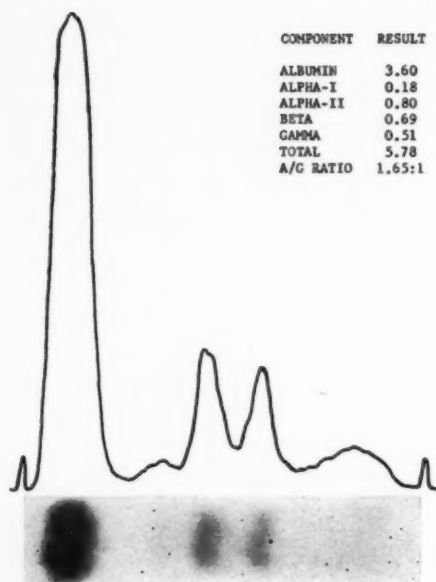


FIGURE 3 HYPOGAMMAGLOBULINEMIA: This pattern is typical of the hypogammaglobulinemia found in children. In the majority of cases studied the gamma globulin ranged between 0.5 and 0.75 gm.%. An increased alpha-II globulin is frequently found due to the repeated infectious and inflammatory processes occurring in this disease.

7.

symptoms in this case compare with the now recognized symptoms of secondary cryoglobulinemia. From past and present recognition of the diverse manifestations of cryoglobulinemia, it is becoming increasingly evident that this syndrome is not, nor has been in the past, a rare occurrence in clinical medicine. The advent of electrophoresis and other laboratory procedures has only increased the awareness of its occurrence. The presence of a cryoglobulin may also indicate the presence of macroglobulins since these abnormal proteins often occur together (16,20,21), presenting clinical manifestations of both the cryo- and macroglobulins.

Pyroglobulinemia is the antithesis of cryoglobulinemia. The pyroglobulins are precipitated or gelled in the presence of heat (40-60°F) and most often occur in cases of multiple myeloma. However, these heat-coagulable globulins may be present in pathological conditions not related to myeloma(24). The clinical symptoms occurring in the presence of pyroglobulinemia are similar to some of those which are co-existent

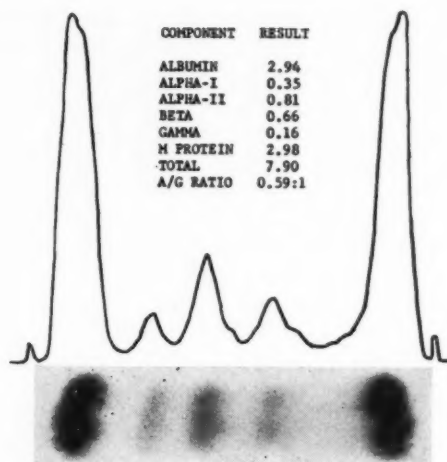


FIGURE 6 MULTIPLE MYELOMA: This case of multiple myeloma had been previously diagnosed on the basis of bone marrow and x-ray studies. The quantity of myeloma protein demonstrated is about average; however, the abnormal protein may range from 0.5 to 10.0 gm.%. 8.

with cryoglobulinemia. Pyroglobulins have been associated with a few diseases, such as lymphosarcoma, but in some cases pyroglobulins were present in clinically healthy individuals. (Hyperglobulinemia occasionally being the only abnormal finding(24).) Unfortunately the study of the pyroglobulins has been very limited, and very little is known about the heat coagulable globulins.

Myeloma proteins are perhaps the most widely recognized abnormal proteins encountered in electrophoretic studies. The myeloma protein of the serum and the Bence Jones protein of the urine are high molecular weight proteins, however, their molecular weight is much less than either the macro- or cryoglobulins. The myeloma protein of the serum possesses a molecular weight of 160,000-200,000(25) and the Bence Jones protein of urine has a molecular weight of approximately 37,000(24). It has been suggested that Bence Jones protein may be a precursor or an abortive product of serum myeloma globulin synthesis. Bence Jones protein occurs in both urine and blood(26). Its occurrence in the urine, in the absence of abnormal serum proteins, does not always conclude a myeloma(24). (Bence Jones protein may also occur in the serum and may not be demonstrable in

the urine(26).)

When serum myeloma proteins are present in sufficient concentration to be electrophoretically demonstrable, they may migrate in any of the globulin regions from alpha to gamma. The myeloma protein most commonly migrates in the gamma globulin region. Very occasionally the myeloma protein may migrate in the beta position and on very rare occasions in the alpha position.

The quantity of abnormal serum protein does not seem to correlate with the severity of the clinical manifestations. In two cases of previously undiagnosed multiple myeloma encountered by the authors, the myeloma protein exceeded 7 gm.%. .

In addition to the recognized macroglobulins, cryoglobulins and myeloma proteins, the authors have been fortunate enough to observe several cases in which the small quantities of abnormal protein could not be classified as cryoglobulins, or myeloma proteins, nor did they exhibit the symptomatology of macroglobulinemia. In one such case an abnormal protein was demonstrated three times on two different serum samples. At this time the only gross abnormal physical finding was an enlarged liver. Over a month later the liver enlargement had regressed and the abnormal protein was not demonstrable. Another patient, who subsequently went to Mayo Clinic, exhibited a persistent unexplainable abnormal protein. This patient had suffered a severe reaction to a scorpion sting some time previously. Another patient who suffered from auto-agglutination also exhibited an abnormal protein.

Since these abortive proteins can occur and disappear from some obscure disturbance of protein metabolism it must be concluded that a diagnosis of multiple myeloma or cryoglobulinemia must be carefully considered in patients exhibiting small quantities of abnormal serum proteins.

SERUM LIPOPROTEINS

Within the last few years paper electrophoresis has been used extensively in the study of atherosclerosis. The ultimate aim of the fervent research conducted in the field of lipid

chemistry and electrophoresis is to detect and predict the coronary artery diseases which are pathologically related to lipid transport and metabolism. The serum proteins, stained by the usual methods (i.e. bromphenol blue) have not been found to be of any value in either the diagnosis or the prognosis of atherosclerotic disease. When the electrophoretically separated serum proteins are stained with a lipid dye, a characteristic pattern emerges which is representative of the lipid content of the serum proteins. Although small amounts of lipids migrate in association with all of the serum protein fractions, the fractions which seem to be an index of atherogenic activity are the alpha and beta lipoproteins(27,28). The alpha lipoprotein migrates in the region of the albumin and alpha I globulin. The beta lipoprotein migrates in the beta globulin position. The alpha and beta lipoproteins carry almost all of the serum lipids. The alpha lipoprotein (under normal conditions) is composed of 50% protein, 25% cholesterol, and 25% phospholipid; the beta fraction is 25% protein, 50% cholesterol, and 25% phospholipid(29). Electrophoretic and other studies (ultracentrifuge, chemical analysis) have associated the occurrence of atherogenic activity with abnormalities occurring in the serum lipoproteins. In electrophoretic studies an increased beta lipoprotein and a decreased ratio of alpha lipoprotein to total lipoprotein has been found in atherosclerosis(27-28).

Smith(30) has compared the sera of normal patients and those with peripheral and coronary artery diseases and has demonstrated a pre-beta-lipid fraction in association with myocardial infarction. However, the demonstration and quantitation of this fraction has no definitive value.

Lipoprotein studies have not been used to any great extent as a routine clinical procedure. There are a number of reasons for its restricted use. Research has continued at such a fast pace that methodology almost becomes obsolete by the time it is published. The terminology and normal values are not consistent and may not, in many instances, be comparable with other results in the same field of endeavor. Staining methods are expensive, tedious and difficult to standardize, making them impractical for routine usage. In addition to the wide variation of methodology, electrophoretic separation of the

CHART A

CONDITION	RACIAL PREDOMINANCE	DEMONSTRABLE HEMOGLOBINS	COURSE	SICKLE CELL PHEN.	TARGET CELLS	HYPOCHROMIA	MICROCYTOSIS	ALKALI*** DENATURIZATION FETAL HEMOGLOBIN AS % TOTAL HGB.
Normal		A						Less than 5%
Sickle Cell disease	Negro	S	Severe	Pos.	+	Slight		Up to 40%
Sickle Cell trait	Negro	A/S	Asymptomatic	Pos.	-			
Sickle Cell-Thal	Italian-Greek Negro* Mex.	A/S**	Severe	Pos.	+++	Marked	Marked	Up to 20%
Sickle Cell-C	Negro	S/C	Mod. to severe	Pos.	+++	Slight-Mod.	Slight	Up to 10%
Sickle Cell-D	Negro, Indian Caucasian	S/D	Mod. to severe	Pos.	+	Slight	Slight	
Sickle Cell-G	Negro	S/G	Asymptomatic	Pos.	-			
Hgb-C disease	Negro	C	Moderate		+++	Very slight	Very slight	Up to 7%
Hgb-C trait	Negro	A/C	Asymptomatic		+++			
Hgb-C Thal	Negro	A/C	Mild		+++	Very slight	Slight	
Hgb-D disease	Negro, Indian Caucasian	D	Mild		++	Slight	Slight	
Hgb-D trait	Negro	A/D	Asymptomatic					
Hgb-E disease	Oriental	E	Mod.-severe		++-+++		Slight-Mod.	May be slightly over 5%
Hgb-E trait	Oriental	A/E	Asymptomatic					
Hgb-E Thal	S.E. Asians	A/E	Mod.-severe		+++	Moderate	Marked	Up to 40%
Hgb-G disease	Negro	G	Asymptomatic					
Hgb-G trait	Negro	A/G	Asymptomatic					
Hgb-H Thal	Chinese	A/H	Mod.-severe		+	Slight	Slight	
Hgb-I trait	Negro	A/I-	Asymptomatic					

* Rare in the Negro race.

** Thalassaemia hemoglobin denoted A₂ demonstrable only by starch electrophoresis.

*** Some authors report these percentages in lower values than stated here; however, Huisman, Clin.Chem.; 3:382, 57 expresses doubt that the current methods are suitable for the quantitation of percentages lower than 5%.

lipoproteins has not yet shown consistent abnormalities which may be of value in the diagnosis of atherogenic activity.

ANEMIA AND ABNORMAL HEMOGLOBINS

Electrophoretic studies have unveiled the underlying inborn errors of a number of idiopathic anemias. A case of unexplained anemia has been attributed to a beta globulin abnormality. In this case the beta globulin fraction was not electrophoretically demonstrable (31). Since the beta globulin carries the iron binding globulin, transferrin or siderophyllin, the absence of, or very low levels of beta globulin, seems indicative that the normal pathway for the transfer of iron is not available. This laboratory's separation of the serum proteins in several cases of apparent iron deficiency anemia, which responded poorly to therapy, showed low beta globulin levels. However, a lowered beta globulin is not always an acceptable criterion for the explanation of poor therapeutic response in iron deficiency anemia, since lowered beta globulin levels often occur in other diseases (i.e. hypogammaglobulinemia, severe infection and inflammation) without any evidence of co-existent anemia.

Since the first demonstration of the electrophoretic characteristics of hemoglobins in 1948, a total of ten different hemoglobins have been demonstrated (32-33). These hemoglobins have been designated A (normal), F (fetal), S (sickle cell), C, D, E, G, H, I, and J. Some of the abnormal hemoglobins are demonstrated in a true homozygous state. It will be noted in Chart A that the simple heterozygous or trait conditions of these abnormal hemoglobins are generally asymptomatic and do not give rise to morphological abnormalities of the blood, except for the presence of target cells in hemoglobin C trait. However, any of these hemoglobins may be found in an heterozygous combination with thalassemia resulting in a moderate to severe hemolytic anemia.

For the differentiation of the various hemolytic anemias careful examination of erythrocyte morphology, electrophoretic separation of hemoglobin, and results of alkali denaturation are of extreme importance.

The alkali denaturation is a test for the detection and quantitation of F hemoglobin. At the time of birth F hemoglobin comprises 55-98%

of the total hemoglobin (34). At the end of 12-18 months the F hemoglobin value has decreased to less than 5% which is considered the normal adult value.

Although F hemoglobin may be demonstrated electrophoretically, the alkali denaturation test is necessary for the quantitation of fetal hemoglobin since the electrophoretic mobility of hemoglobin F does not allow accurate quantitation of the lower percentile values. Since any amount of F hemoglobin above 5% in an adult is considered pathological, the alkali denaturation test is essential in the classification of some of the hemolytic anemias. It will be noted in Chart A that the F hemoglobin value is elevated in most of the hemolytic anemias in which thalassemia is evident in combination with other abnormal hemoglobins. In thalassemia major the percentage of F hemoglobin demonstrable may be as high as 90% of the total hemoglobin.

SUMMARY

The authors have attempted to present a concise and critical resume of the use of electrophoresis in clinical medicine with special reference to its most advantageous diagnostic and prognostic usage. The references listed are major works which are corroborated by many other investigators, or are individual findings which are substantiated by valid research. The results of electrophoretic studies performed in this laboratory are correlated with the existing literature.

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SECOND ANNUAL AWARD FOR PRIZE-WINNING PAPER

March 15th is the deadline for accepting original papers to be entered in open competition and judged by the Scientific Assembly Committee for the second annual award.

The Association has established this award "to stimulate research and original clinical effort" and to recognize the best scientific presentation by an Arizona physician.

The successful entry will be read by the author during the convention, and the award, a bronze plaque, will be presented at the president's dinner dance.

Experiences with Intravenous Abdominal Aortography

A Report of Fifteen Cases

By

George A. Gentner, M.D.*

and

K. Herbert Huber, M.D.†

This is to be a section on roentgenology, and we hope to make this a regular feature of each issue of the journal.

The many fine roentgenologists in the State of Arizona are respectfully and earnestly requested to contribute to this section. Articles or case reports will be equally accepted. Special care will be taken in the future to try and ensure acceptable reproductions of roentgenograms.

It is requested that material submitted be typewritten (double spaced) and carefully edited by the author. This will facilitate the task of the section editor. Photographic copies of roentgenograms should be carefully prepared and suitably cropped before submission. Glossy prints, approximately 3 inches square, would be suitable.

THIS report is based on a study of fifteen cases of intravenous aortography performed at Maricopa County General Hospital, Phoenix, Arizona.

Intravenous aortography is not new. It has developed gradually over a period of years as a by product of the nephrogram and nephrotomogram techniques. The nephrogram technique was developed following Robb and Steinberg's work on angiocardiology. When a nephrogram was made using a rapid change cassette it was noted the great vessels in the abdomen were demonstrated occasionally. Weems, et al.,(1) reported successful aortograms in 1948 using 70 per cent Diodrast intravenously. Wall and Rose(2) demonstrated the abdominal aorta in fifty per cent of the films of their series in 1951 using Urokon Sodium 70 per cent. Inter-

est declined until recently when 90 per cent Hypaque and 85 per cent Cardiografin were developed, as these contrast media are apparently less toxic than the media previously used. Also previously the intravenous techniques used did not consistently demonstrate the aorta.

In 1958 Bernstein, et al.,(9) reported consistently successful aortograms using intravenous injections of 90 per cent Hypaque and 85 per cent Cardiografin. They used I¹³¹ Renografin and a scintillation counter to determine the arm vein to abdominal aorta circulation time. They at first used a rapid change cassette, but later changed to a prolonged (six second) exposure. This technique has the disadvantage that it cannot be used at smaller hospitals because of expense and ready availability of equipment.

Another technique developed and reported by Steinberg, et al.,(13) needs no special equip-

*Department of Radiology, Maricopa County General Hospital, Phoenix, Arizona.

†Resident in Surgery, Maricopa County General Hospital, Phoenix, Arizona.



Fig. 1. Case 2. Aortasclerosis

ment and can be accomplished at any institution. It was the purpose of this study to duplicate the reported results using the Steinberg technique. There have been no complications reported using the Steinberg or the Bernstein techniques.

TECHNIQUE FROM STEINBERG

After the determination of the Decholin circulation time from an antecubital vein, 1cc./kg. body weight of 90 per cent Hypaque is injected as rapidly as possible in the antecubital veins of both forearms (one half dose in each arm) and a KUB film is taken using a three to five second exposure, starting the exposure one half second after the predetermined circulation time. The injection is made through a large bore needle (Robb 12 gauge angiocardigraphic needle) or a cut down (No. 280 polyethylene tubing). Patients are pretested for sensitivity to Hypaque.

RESULTS

Roentgenograms were evaluated on the basis that they could or could not be interpreted with

accuracy. A film was rated as satisfactory if there was sufficient opacification of the aorta for reasonable interpretation. The films were rated as unsatisfactory if they could not be interpreted accurately, even though some degree of opacification was present.

A second injection can be made immediately if unsatisfactory films are obtained. This was done in six cases in our series, the second film being satisfactory in two instances.

Classifying the films on this basis 66.6 per cent of the aortograms were satisfactory for diagnostic purposes. Some degree of opacification of the abdominal aorta was present and excellent nephrograms were obtained in all cases.

The last case shown on the table was an attempt at cerebral arteriography by the same technique. The main branches of the aorta, vertebrals and subclavian vessels visualized well, but there was too much capillary filling to be able to interpret the cerebral films. It is felt that refinement of the technique might improve the possibility of successful cerebral arteriograms with the intravenous method.



Fig. 2. Case 11 Aneurysm Abdominal Aorta.

SIDE REACTIONS

All of our patients experienced a "hot flash" a few seconds after the injection. This is a known reaction with the use of Hypaque and it may have been intensified by excessive warming of the contrast material to make it more fluid and easier to inject, but the latter is doubtful.

Two patients became nauseated following the injection, but did not vomit. A third patient became nauseated with associated vomiting following the injection of Decholin. Another patient experienced abdominal cramps, nausea and vomiting approximately one hour after the injection of the contrast material, but this reaction occurred while a retroperitoneal air study was being performed and it was not classified as a side reaction of the aortogram.

Dosage of Hypaque ranged from 50cc. to 160cc. for each patient, the larger dose being in patients where the procedure was repeated immediately. An elevated BUN was not used as a contraindication to the procedure, and there seemed to be no additional effect from the larger doses used.

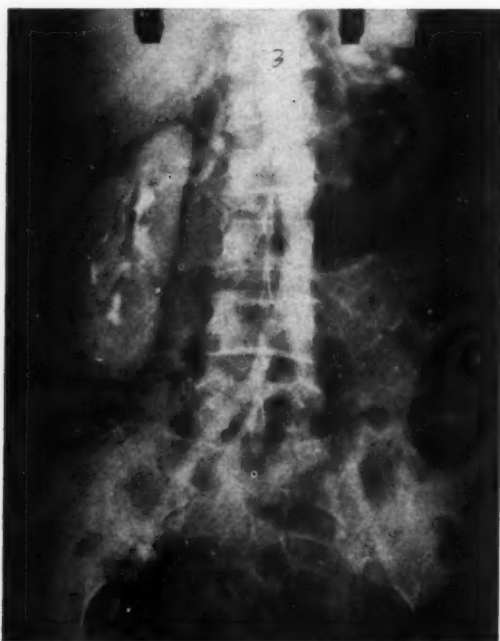


Fig. 3. Case 5. Absent Left Renal Artery and Kidney—Congenital.

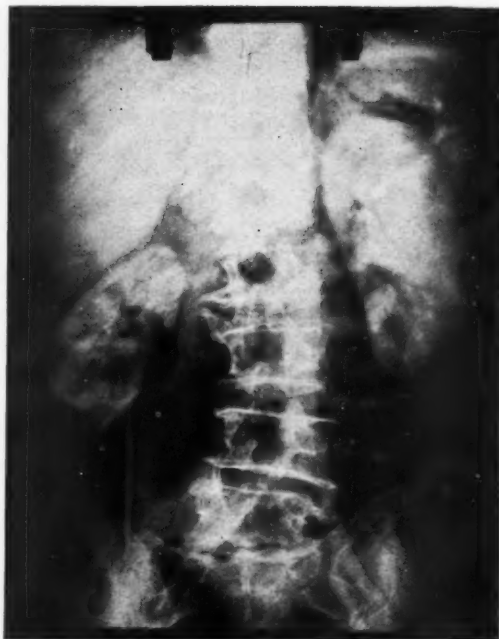


Fig. 4. Case 3. Typerhephroma, Left Kidney.

A BUN and urinalysis was obtained on all patients before and after the test. The lowest preaortogram BUN is reported where more than one is available and the highest post aortogram BUN is reported, even though some of these patients had renal surgery in the interim. (See Table). There was no essential change in the urinalysis.

COMMENTS

Although we were unable to duplicate Steinberg's reported results, we did have reasonable success with intravenous aortography. It is felt that more rigid criteria for the selection of patients would have increased the per cent of satisfactory films. The patients in our series ranged from 39 to 82 years of age, with an average age of 66 years. A few of these patients were debilitated with their disease, or in border line cardiac failure. If these patients were eliminated there would be a considerable increase in the per cent of successful cases.

It should also be noted, from the table, that a number of ancillary diagnosis can be made using the procedure, even when the aorta does not visualize well, especially in the urologic field.

TABULATION OF CASES

CASE	SEX	AGE	CLINICAL DIAGNOSIS	PRE BUN mg.%	POST BUN mg.%	DECHOLIN CIRCULATION TIME	SECOND INJECTION	QUALITY OF AORTOGRAM	XRAY DIAGNOSIS	OPERATION
1	F	39	R. O. Aortic Aneurysm	15.0	12.5	14.0 Sec.	No	Satisfactory	Normal Aortogram	None
2	F	76	R. O. Aortic Aneurysm	33.0	28.5	14.0 Sec.	No	Satisfactory	Aortic sclerosis Normal Nephrogram	None
3	F	74	Tumor Left Kidney	17.5	30.0	12.0 Sec.	Yes	Satisfactory	Normal Aortogram Hypernephroma Left Kidney	Left Nephrectomy for Hypernephroma
4	F	82	Cyst or Tumor Left Kidney	18.0	27.0	13.0 Sec.	Yes	Unsatisfactory	Hypernephroma Left Kidney	None - Dx. Confirmed at Autopsy
5	F	68	R. O. Absence of Left Kidney	22.0	20.0	15.0 Sec.	No	Satisfactory	Absent Left Renal Artery and Kidney - ?Congenital	None
6	M	65	Tumor Left Kidney	22.0	22.0	14.0 Sec.	Yes	Unsatisfactory	Hypernephroma Left Kidney	Resection Large Renal Cyst
7	M	75	R. O. Right Iliac Artery Occlusion	17.5	28.5	16.0 Sec.	No	Satisfactory	Advanced Arteriosclerosis	EM Amputation
8	M	60	R. O. Thrombosis Right Iliac Artery	30.0	20.0	13.0 Sec.	Yes	Satisfactory	Right External Iliac Artery Occlusion	Attempted Embolectomy
9	F	57	R. O. Pheochromocytoma	18.5	20.0	14.5 Sec.	No	Satisfactory	Normal Aortogram and Nephrogram	Exploratory Laparotomy
10	M	50	Arteriosclerotic Gangrene Right Foot ?Thrombosis	11.5	11.5	10.5 Sec.	No	Unsatisfactory	Normal Nephrogram	Right Mid Thigh Amputation
11	M	67	Aneurysm Abdominal Aorta	16.0	26.5	17.0 Sec.	No	Satisfactory	Abdominal Aortic Aneurysm	Resection of Aneurysm with Dacron Graft
12	M	57	Thrombosis Right Iliac Artery	32.0	44.5	12.2 Sec.	No	Satisfactory	Hiding Thrombus	Attempted Thrombectomy
13	F	73	Aortic Aneurysm	24.0	19.5	20.4 Sec.	Yes	Unsatisfactory	Normal Aortic Bifurcation and Iliac Vessels	None
14	M	80	Bilateral Iliac Artery Aneurysm	41.5	30.0	18.0 Sec.	Yes	Unsatisfactory	Right Hydro-nephrosis with Nonfunction Left Kidney	Supracondylar Amputation Right
15	F	70	R. O. Aortic Aneurysm	17.5	22.0	10.0 Sec.	No	Satisfactory	Nonfunction Left Kidney	None
	F	48	R. O. Intracranial Neoplasm	32.0	21.0	10.5 Sec.	Yes	Unsatisfactory Cerebral Arteriogram	Normal Vertebral and Carotid Arteries Normal Pyelogram	None

CONCLUSIONS

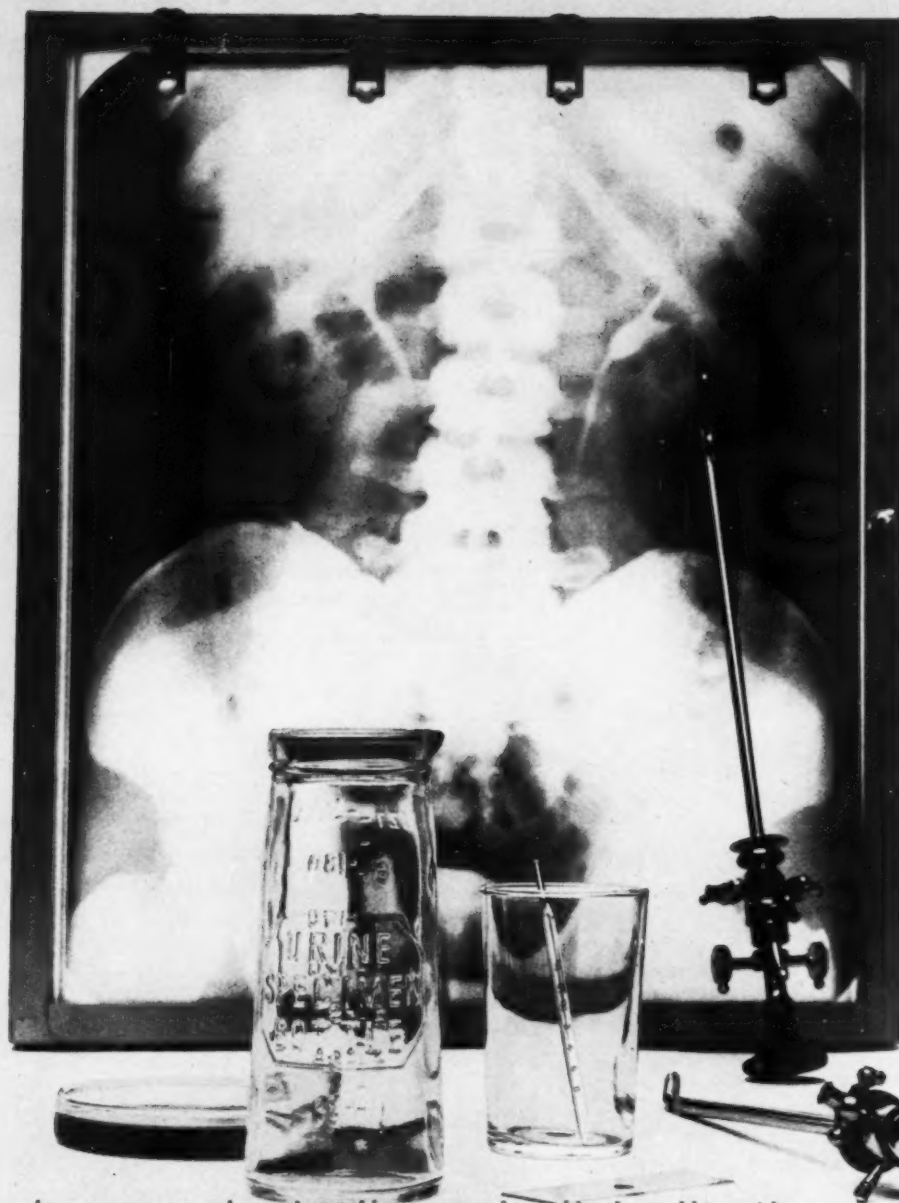
When aortography is indicated, the intravenous technique is reasonably safe and satisfactory films can be expected in 66.6 per cent, or more, of the cases. If a failure occurs this does not eliminate the possibility of a translumbar or retrograde attempt being made later.

AUTHORS' NOTE

We wish to express our gratitude to Ernest E. Born, M.D., surgical resident at Maricopa County General Hospital for his assistance during these tests.

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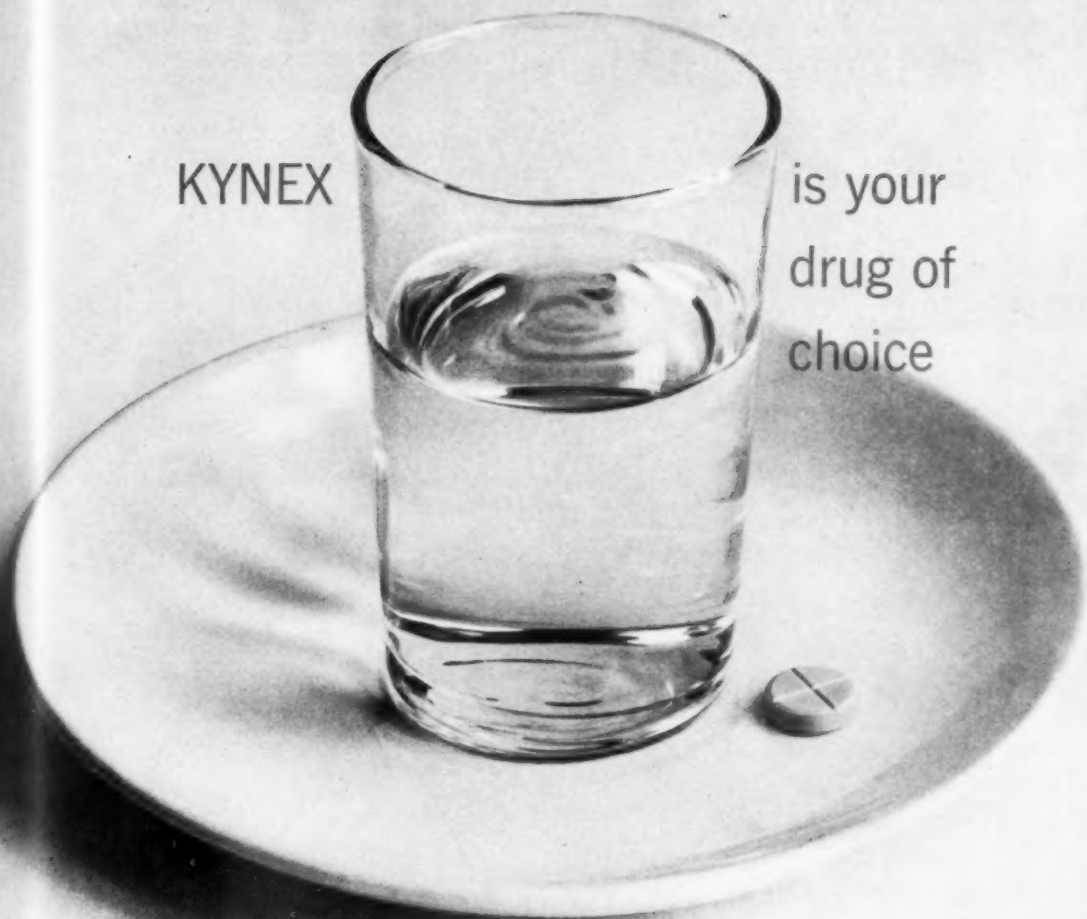
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Children's Common Orthopaedic Problems Of the Lower Extremities*

E. R. Schottstaedt, M.D.

L. J. Larsen, M.D.

R. K. Ashley, M.D.

J. N. Callander, M.D.

Shriner's Hospital for Crippled Children
San Francisco Unit
University of California
Department of Orthopaedic Surgery

At the Arizona State Medical Association Meeting in Scottsdale Dr. E. R. Schottstaedt of San Francisco gave a couple of very timely papers on orthopedic problems. The paper on the lower extremities where he discussed the common orthopedic problems in relation to the feet and knees was of particular interest to pediatricians and general practitioners as well as to the orthopedic surgeons.

Most of these problems are not too serious and can be handled well with the conservative measures outlined by Dr. Schottstaedt. Of particular interest to the parents is the pronation or valgus of the feet with weight bearing and the internal torsion or toeing-in as they are learning to walk. In many of these instances the sleeping habits of the child have to be altered, and the use of the appliances as he has outlined gives very satisfactory results.

ALS

THE pediatrician, orthopaedic, and general practitioner are vitally concerned with the gait and postural variations and attitudes in the child from infancy, especially through the ages of 5 and 6. Usually the problem ceases to demand the focus of attention by this time for the problem is either solved or the plan of proposed procedure is well outlined.

These conditions for which our advice is constantly sought divide themselves into those relating to the foot, rotational lower extremity

problems, varus or valgus of the knee, and recurvatum.

PES PLANUS

The most common foot problem is that of valgus, pes planus, or eversion as one cares to designate it. There is some difference of course in the meaning of these different terms, but they are all used to designate the flatfoot.

The child until the age of 3 years has no arch, or a poorly developed arch, yet some children demonstrate excessive or valgus beyond the normal for their age group. Here there is an

*Presented at the annual meeting of The Arizona Medical Association, Scottsdale, May 4-7, 1960.

obvious bulge, and outward angulation of the forefoot on the hindfoot. The os calcis assumes an inclination into valgus of from 10 to 15 degrees. The foot may not have a demonstrably tight tendo-achillis though the calf may be functionally overactive. The foot is flexible and can be easily corrected in contradistinction to the rigid foot with congenitally short tendo-achillis and plantar flexed talus which are more rarely seen.

These feet will also show a plantar flexed talus but the flexibility of the foot is a distinguishing feature. This division of flexible flatfoot is arbitrary and a matter of degree. Certainly the average flatfoot in the child does not require plaster correction, but the more severe cases do better with specific treatment.

This classically consists of plaster casts, either short leg or long leg, depending on the physician's choice. The casts should be changed weekly during the period of rapid foot growth, but usually every two weeks will be enough to keep up with growth and cast breakage.

Treatment should extend over at least 3 months. The foot should be held in heel varus, heel dorsiflexion (calcaneus) with eversion of the forefoot upon the heel. This is not to be confused with the position of inversion of both the forefoot and heel.

Following plaster correction a modified Dennis Brown bar is used holding the feet in inversion, and a standard Thomas heel built so that there will be a $\frac{3}{4}$ " advance of the heel along the medial margin of the shoe and a medial heel wedge of $\frac{3}{16}$ " to $\frac{1}{4}$ ".

The most anterior edge of the medial margin of the heel correction should be the highest point of the correction so that the foot rolls over it in walking; thus transferring the weight bearing laterally toward the middle of the foot.

Shoes, to be effective, must fit in the heel and have a stiff heel counter and leather soles. If slightly greater correction is sought or the treatment results in an internal rotation of the legs in walking, an outer sole patch of $\frac{1}{8}$ to $\frac{3}{16}$ " may be used. This gives the same emphasis to the arch as the described cast position accomplishes.

Do not use the medial wedge carried beneath both heel and sole, for this variation results in the foot being held in a medial inclination rather than arch accentuation. Inside arch supports of felt or steel may be helpful, though not mandatory.

The heel correction is by far the most important for it tips the heel and thus shifts the weight-bearing line to its proper postural alignment.

Varying degrees of flatfoot deformity are treated on this plan with whatever vigor is decided upon by the physician in charge, for some, treatment will include an inversion bar, arch support, and heel correction. Others, inside support and heel correction, and still others (the greater majority) shoe correction alone, using only the heel portion of the proposed shoe correction. In other words the commonly described Thomas heel.

Inversion bar correction is not commonly used for more than a year. Shoe correction, and inside arch supports may be necessary throughout the entire period of growth. Once extremity bone growth has ceased, at about 14 in females and 16 in males, such treatment is supportive for the foot will no longer change developmentally.

Those feet that are functionally insufficient as evidenced by pain on weight bearing activity may be treated by the bone procedure found most useful.

In our hands the most suitable procedures have been the Hoke flatfoot procedure, the Chambers flatfoot procedure, and triple arthrodesis.

The first and second named procedures should include tendo-achillis lengthening as described by the authors, for it is a tight tendo-achillis or functionally overactive one that results in rotation of the os calcis beneath the astragals, allowing the superior or astragalar process of the joint margin to be forced against the inferior surface or base of the sinus tarsi and thus molds the os calcis. Bear in mind; however, that flatfeet are not necessarily painful and should not be operated upon unless functionally insufficient.

Rarely do we find painful flatfeet in the very young, but occasionally it has been found advisable to do corrective foot surgery when the condition is associated with pain or extreme deformity in those over the age of 4.

The differential diagnosis of flatfoot in extreme cases should include X-rays to demonstrate the extreme plantar flexed talus which is seen with the more flexible flatfoot, but is easily distinguished clinically from the plantar flexed talus associated with a contracture of the tendo-achillis.

These latter are part of a fixed congenital deformity which requires plaster correction, and very often demands surgical intervention, even at a very early age to give adequate length to the tendo-achillis and allow the foot to be brought into inversion.

Ligamentous incision of the forefoot will also be necessary to help return the bones to their normal relationship.

ROTATIONAL DEFORMITY

There are at least 5 variations which should be discussed at this time. It should be emphasized at this point that there are no truly dependable clinical X-ray criteria for substantiating this diagnosis. Many attempts have been made to put the problem on a scientific factual basis and studies on skeletons can be cited. They have been singularly unrewarding in clinical evaluation. It would seem that this is chiefly a clinical diagnosis.

(A) External rotation of one or both lower extremities is often noted in the infant about the time he stands. This is usually confined to one leg; seldom does it reach the attention of the orthopedist until he is 8 or 9 months old.

The extremity demonstrates no contracture and is easily correctable manually. This condition has been associated with a "pusher foot" by pediatricians, and certainly this seems to often be true. However, occasionally it is seen in both lower extremities at the same time which is most confusing if the aforementioned etiological factor is to be credited.

Various sleeping positions have been incriminated and perhaps rightly so, but regardless of the etiologic factors involved, treatment is best provided through the use of a Dennis Brown or other rotational bar used at night and at nap time. Usually the entire deformity is corrected within 3 months.

The externally rotated foot should be internally rotated so that the patella points inward 15 to 20 degrees. The foot may turn in considerably more than this.

(B) Internal rotation of the entire lower extremity. This condition may be unilateral but in contradistinction to the foregoing it is usually bilateral. The entire extremity is internally rotated. There is an apparent proper relationship of foot to patella. The problem lies in the region of the hip.

Hip X-rays are usually negative in both this and the foregoing condition, but it is generally wise to have them for a record since occasionally dysplasia and rarely dislocation are associated with a rotational problem.

To demonstrate the condition by examination, grasp the femoral shafts above the patella so that the femurs may be internally rotated and in this condition the patellae usually will face one another at 90 degrees and can only be externally rotated manually from 5 to 15 degrees. The problem is thought secondary to an anteversion of the femoral neck. As a result of the passive range available the child chooses to use a portion of the range of internal rotation for his middle range and the one that he walks in most comfortably.

Often he can consciously hold the extreme external rotation to neutral as he walks. Without such conscious concentration this is not possible. The position of choice, which is the position of deformity is more noticeable when the child is running or when he is tired. This matter of relationship of fatigue is of course related to his lack of interest in holding his legs externally rotated as he becomes more tired.

Many of these children will correct spontaneously with growth just as will other rotational problems in this group, but it is impos-

sible clinically to determine which will and which will not correct; for which reason treatment is deemed wise for the entire group.

As children grow older they often become more conscious of themselves and walk better even if there is still some internal rotation deformity remaining.

In the first 2 years of life this condition is a problem cosmetically, and because these children are continually tripping over their own feet and falling. Occasionally the problem is not simply controlled. The child continues to trip himself more often and is a cosmetic problem unacceptable to the parents. This of course is more often true in girls where skirts make it more noticeable, than it is with boys where trousers hide the deformity.

This group may also be treated with Dennis Brown bars. Here the feet of the involved lower extremity are held in external rotation between 60 and 90 degrees. Usually a position somewhere between 70 and 80 degrees is most useful. Admittedly there is some stretch of the tibia at the knee joint upon the femur, but this does no harm.

Treatment is at nap and night time and is usually necessarily continued longer than in (A). Occasionally it is necessary to continue the correcting brace as long as a year, in conjunction with the bar and outer sole patch, or occasionally a hose twister brace, similar to that used in the treatment of internal rotation of cerebral palsy may be advisable.

In those few children who do not respond, and where the deformity is a serious consideration in gait from a functional or cosmetic point of view, osteotomy of the femur is advisable since it is the only treatment which can fully correct the problem and place the patellae in their normally externally rotated position in relation to the foot in walking. This procedure may be done either in the proximal or distal third of the bone.

(C) Occasionally one lower extremity will internally rotate and the other will externally rotate. Here the bar may be used holding each leg as indicated by the deformity.

(D) Internal rotation of the tibia upon the femur at the knee joint is also quite common. Here the femur grasped above the knee and rotated demonstrates a normal range of both internal and external rotation with the child lying upon his back. The patellae fall in the rest position of above 10 degrees of external rotation; however, the foot and lower leg are internally rotated. The lower leg is easily rotated back to normal relationship. This is best demonstrated by flexing the knee to 90 degrees and externally rotating the lower leg to its correct position.

The condition is thought by many to be related to sleeping in the facelying position with the thighs flexed and the lower legs internally rotated. In any event it is not easy to correct by telling the mother to prevent such sleeping positions, and often will persist for several years without treatment.

It is treated early by a plaster cast, holding the lower leg and foot externally rotated with the knee previously flexed to 90 degrees. Knee flexion is necessary so that an adequate fixation can be obtained above the knee joint to maintain the corrective position of the tibia on the femur.

An external rotation bar will occasionally be effective if the foot is set out at 90 degrees. The femur easily externally rotates to 60 degrees, and to be effective the tibia must be in line with the femur, using the patella as the point of reference. Two or three months are a necessary minimum as a treatment period. Surgery is almost never indicated.

(E) More rarely we see an external rotation of the tibia upon femur. Here the child tends to correct a basic internal rotation of the femur by walking with the femurs slightly internally rotated so that the patellae tend to point inwards 10 to 15 degrees while the feet are externally rotated from 15 to 20 degrees. The internal rotation of the femur or anteversion of the femoral neck results in the internal rotation position of the femur.

The condition cannot be corrected with a Dennis Brown bar for full correction and may later come to surgery. Conservative treatment after

the age of 5 is seldom effective; however, bear in mind that this is a cosmetic problem and be certain that the deformity is severe enough to present a real cosmetic or psychologic problem.

VALGUS AND VARUS OF THE KNEE

There are 2 other major problems that affect the child, especially from 1½ to 6, and hence are of concern to parents and physicians. These revolve about the lateral and medial deviations of the lower extremities from the midline with the knee as the usually accepted focus of attention.

Valgus is extremely common, and certainly frequently brought to the attention of the physician. It is more easily accepted in the male child than in the female, and the degree of concern manifested by the parents varies considerably. The deformity is generally fairly symmetrical, and for each pair of extremities deviations from the 180 degree femur tibia relationship occur in varying amounts.

This disparity is measurable between the malleoli, in inches. It should be born in mind that there is a normal lateral deviation present in most children as well as adults, and this must be taken into consideration in evaluating the condition.

A distance of from 1 to 2" between the malleoli is not at all uncommon and occasionally 3" may be measured between the medial malleoli with the knees held in contact with one another. A pes planus of varying degrees is a common concomitant but not essential. Thomas heel correction gives some improvement though, and seems to favorably influence a long term return to normal, but more especially the problem is resolved in general by the normal growth process.

A 2" deviation at 3 years is quite noticeable, while a 2" to 3" deviation at 12 is not remarkable.

Not only do these deviations from the midline tend to actually correct themselves, but longitudinal growth hides them. Occasionally knock knee braces worn as night, or as day and night braces are helpful.

Osteotomy is almost never indicated except in

extreme cases and should be deferred until the age of 10 to 12 years. At this age very few osteotomies will be found necessary. It must be clearly understood that the above discussion concerns only the physiological knock knee and not those associated with polio or other paralytic conditions; nor those due to partial epiphyseal closure.

Varus deformities are much more uncommon and the concern is that a case of rickets may be overlooked. Careful dietary history and full leg X-rays are necessary. Occasionally resistant rickets or renal rickets may need be differentiated. In addition to general signs a metabolic disturbance will be recognized by the widened band of provisional calcification.

Tibia varum or Blount's disease can cause the same difficulty, but in our particular locale is very uncommon. More commonly the X-rays show some beaking of the medial margin of the epiphyses and frequently a dense band of cortical thickening along the medial side of the tibia without widening of the epiphyseal line.

These changes represent variations within normal limits, and will gradually disappear with growth. Here again the treatment depends on the degree of deformity and the anxiety of parents. Many can be followed for a few months for better evaluation of the progression or regression of the condition.

In general, however, this problem causes much more alarm and corrects itself more slowly. If the deformity is within acceptable limits watchful waiting is the treatment of choice. If there is progression, undue anxiety, or a severe cosmetic variation, long leg braces are the best treatment. These are worn both day and night for the first 2 to 3 months and then only at night.

They are extremely hard to fit in the first year of life because of rapid growth and in general are not applied until the growth rate has decreased in the late first year or the second year. We use a double bar, long leg brace with no knee joints, having a broad push pad above the knee medially to press against the medial side of the femur and an inside T strap at the ankle. These 2 points act as counter pressure for the main corrective force that is applied through a

broad leather strap with three buckle attachments secured over the medial bar of the brace, the brace having been previously bent out medially to allow the application of adequate correction. This is usually effective within a 6 month period.

Osteotomy is rarely necessary except for the varus associated with renal rickets or resistant rickets, and in these circumstances should only be done following correction of the basic metabolic problem or recurrence of the deformity is inevitable.

RECURVATUM

One last problem is that of the physiological back knee or recurvatum which is fairly common, but less commonly complained about since it is usually not noticed. It is understood that the recurvatum under discussion is not associated with cerebral palsy, poliomyelitis, or conditions affecting the stability of the knee joint. The degree of hyperextension varies from 10 to 30 degrees, usually being 10 to 15 degrees. It is sel-

dom if ever progressive, is often hereditary, and of no real clinical significance. Very often the patient can walk with a back knee or without a back knee at will.

Very often the child walks without a back knee but stands with back knee. Bracing is valueless. Physical therapy consisting of exercises to develop the musculature of the thigh and calf is of no value, and osteotomy almost unheard of for this condition. Osteotomy is, of course, commonly resorted to in this condition when it is severe and associated with a paralytic problem or one of knee instability.

There are other postural variations affecting the growing skeleton, but these do not fall within the scope of this paper. Most of them are associated with metabolic, paralytic, or traumatic problems or are related to osteochondrodys-trophy, or allied skeletal abnormalities.

It is our hope that this article may be of help to the busy clinician in handling the more simple variations of posture and gait as seen in the lower extremity.

SOME Physicians are social snobs,
Mixing French phrases with medical terms,
Collecting dowagers by the gobs,
And treating their gold-plated high class germs.
SOME Physicians are "Umm" and "Ahhh" men
Too busy to bother with explanations.
Who guard their knowledge like ancient Chaumen,
Hiding the truth in strange cantations.
MOST Physicians themselves are tonics
Dispensing confidence with their pills,
Who, without frills and histrionics,
Quietly, patiently cure our ills.

Phyllis Jean Fields

A Follow-up Study of the Colonna Procedure For Congenital Hip Dislocation*

E. R. Schottstaedt, M.D.

Loren J. Larsen, M.D.

R. Kirklin Ashley, M.D.

John N. Callander, M.D.

Shriners Hospital For Crippled Children
San Francisco Unit
University of California
Department of Orthopaedic Surgery

IN 1932 Colonna wrote a preliminary report of his capsular arthroplasty performed on 4 cases in an article dealing with several other approaches to the problems of congenital dislocation of the hip. In this article he gave credit to Hey Groves, who had suggested the procedure in 1927.

Note was made of the fact that there was at that time, 1932, no report of the results of any cases done by this technique reported in the literature.

In January of 1947, at a meeting of the American Academy of Orthopaedic Surgery, he reported in more detail, and made a follow-up report in 1953. All of these reports deal with cases represent the best follow up under similar care, and possible complications.

Case review and analysis were not appended. It is our purpose to review the procedure, its modifications in our hands, and the results that have been obtained at the San Francisco Shriner's Hospital. This does not represent our entire experience with the procedure since many cases have been done in other hospitals.

Continuing follow up of any series becomes a very real problem and our Shriner's Hospital cases represent the best follow-up under similar case circumstances. Some of these cases, especially in the older age group have been closed because the child has become "over age". As yet only a few cases on which we have an adequate follow-up have reached early adulthood.

The group to be reported consists of 38 cases with 44 hips done from March, 1947, until March, 1955, where a follow-up of at least 5 years was available. The period of follow-up varies from 5 to 12 years. Eight cases and 10 hips were discarded from a total of 46 cases since their follow-up extended over a period of less than 5 years (usually between 2 and 4 years).

The oldest case was 13½ at the time of surgery and the youngest, 1¼ years. (In addition to this group done for congenital dislocation, 12 cases with 15 hips were done for various other causes of hip dislocation and will be reported later. These conditions include poliomyelitis, spina bifida, cerebral palsy, multiple joint dislocation, traumatic dislocation, and instability secondary to osteomyelitis of the head and neck

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of femur.)

Not included in this series is one postoperative death occurring the night of surgery associated with adrenal insufficiency.

The procedure in our hands has been varied in some aspects but the basic surgical concept has not changed. In none of our cases was arthroplasty done before the hip could be easily brought to the level of the original acetabulum. In some few this could be accomplished without skeletal traction. The greater majority; however, were treated by preliminary adductor release (occasionally with concomitant section of the hamstrings from the ischial tuberosity) and skeletal traction for 10-21 days. Traction of from 8-12 pounds was necessary and depended on the size of the patient.

When the femoral head has been brought opposite the original acetabulum arthroplasty is performed. This is done through an anterior ilio-femoral approach (Smith Peterson type) rather than the lateral approach described by Colonna, and the trochanter is not detached. This modification was made because of concern over the trochanteric epiphysis. This concern would now appear ill founded in view of Colonna's reports.

The capsule of the hip joint is detached from the acetabular rim — care being taken that none is wasted for excessive capsule is easily trimmed later, but insufficient capsule may cause a poor result.

The anterior and superior capsule are easily freed from the acetabular margin to the base of the trochanter, but it is more difficult to free the capsule to the trochanter posteriorly. Here it is important to detach the posterior capsular rim from the acetabular margin — hold it up with Kocher clamps and unfold (stretch out) the posterior capsule.

If this is not done it may be impossible to get complete coverage without resorting to splitting the capsule, (starting a short distance away from the cut edge so that the new edge can be turned in to fill the gap). This of course results in a thin capsule since only a portion of it is used,

but the filleting does not have to extend over very much of the surface. If this is not possible a fascia lata graft can be used, though fascia lata is not the equivalent of capsular coverage. It is essential that the head be covered and this of course necessitates the cutting of ligamentum teres from the femoral head at the time of capsular closure. No trimming is done to the head in any way.

The acetabulum is now deepened at the site of the original acetabulum. The new socket is deepened in a cup shape. The cup must be deep enough to receive the head covered with capsule so that the entire head is covered with the hip abducted to 25 or 30 degrees. The construction of the new acetabulum is of considerable importance. If for any reason it is necessary to make the new socket higher than the old acetabulum, insufficient bone will be present. This is not apparent from X-ray, but it is true because the wings of the ilium become thinner as the crest is approached from the acetabular roof.

Construction of the acetabulum at the ideal level is not always possible, because there may have been severe molding of the acetabular roof itself by the adjacent femoral head during the time of dislocation.

In any event care is taken to construct an acetabulum which is cup shaped rather than saucer shaped and made through the entire width of the bone to, and occasionally, through, the inner table of the innominate.

The greater the amount of original superior acetabular rim remaining, the greater will be the available bone and thus the better the acetabulum constructed.

When a capacious cup shaped acetabulum has been formed the capsule covered head is gently reduced into it. If the head is well covered with the shaft in neutral position an osteotomy will not be necessary, but in general a position of internal rotation will be found most stable and this can be followed later by osteotomy of the femur. Eighty per cent of our cases had transverse osteotomies done in general from 2 to 4 weeks following arthroplasty, though a few were done at the original time of the arthro-

plasty. We now feel that osteotomy should not be done at the time of arthroplasty, but deferred.

The greater percentage of these were done in the sub-trochanteric region of the femoral shaft, but some few were performed in the supra-condylar region. Following surgery our treatment has varied a good deal.

At the outset of this operative program all cases were placed in hip spicas until the osteotomy was satisfactorily healed — a period of from 2 to 3 months. This program was then evaluated and the decision made to keep all future cases in light traction suspension postoperatively. This was done for several years. At the present time we are placing our cases postoperatively in cast fixation from 2½ to 3 months. A Steinman nail is used to fix the head in position to the acetabulum. This pin is thus available to control the osteotomy position postoperatively. It is left in place approximately 6 weeks. The additional 4 to 8 weeks is spent in a spica to insure adequate healing of the osteotomy.

A position of valgus is to be avoided in post-operative osteotomy position. If a normal angle is not maintained it is wiser to have the osteotomy in slight varus.

The spica is followed by the use of a spreader bar for 6 weeks, night and day, except for bath and exercise, and then with bar only at nap and night time. This program is continued approximately 6 months, depending somewhat upon the stiffness of the hip. If there is excessive tightness in abduction the spreader bar is not used beyond a 3 month period. Weight bearing is begun at the time of cast removal when the patient is out of the bar for exercise.

It would seem as nearly as we are able to determine that there is little difference at 1½ years postoperatively between the hip treated by immediate postoperative traction and that treated by initial cast immobilization.

CASE REVIEW

Arbitrarily the 38 cases have been divided into three age groups. They are those aged 0 to 3, those between the ages of 3 to 5, and

those over 5 years of age. None were done earlier than 1¾ years, and none were older than 13½ years at the time of arthroplasty.

Though the ages 0 to 3, and 3 to 5 might well be merged, it was our feeling from reading Colonna's original articles, that the early age groups should be set apart, to determine whether there was any essential difference.

In view of the operative attack on the acetabulum, none were truly anatomically normal hips, and in many there had been long term molding of the femoral head, and in some cases there was evidence preoperatively of aseptic necrosis.

In general closed reduction had failed to give a satisfactory post manipulative X-ray. Either the head stood away too far or the acetabulum seemed inadequate. Some cases had had previous open reduction and some had had previous shelf procedures. There were also in the group, especially from 3 to 5, a few cases that had had no preliminary treatment except traction to bring the head to the level of the original acetabulum. In an attempt to gain comparable information without obscuring the results in pedantic detail we have arrived at 3 result categories. These are: good, fair, and poor.

1. Good — Those hips demonstrating a range of motion better than 50% of normal, (flexion to 90 degrees +; extension 160/180; abduction 25 degrees +; adduction 20 degrees +; rotation 50% of a normal range)

A negative Trendelenberg test

Good head coverage by the acetabular margin, preventing subluxation (at least ¾ of the head covered)

No pain or tiredness

2. Fair — range = to that of the good result

Equivocal or positive Trendelenberg

Apparent satisfactory acetabular coverage of the head. No pain but some discomfort or tiredness may be complained of by the patient.

3. Poor — all others with limited range

Positive Trendelenberg

Poor head coverage

Pain and tiredness not necessarily present, but may be present.

Group I. 0-3 years of age.

In this group are 8 cases with 9 hips represented

5 good

1 fair

2 poor

1 penetrated, later arthrodesed.

The earliest stage at which arthroplasty was done was 1½ years. One of these was redone later at 8¾ years because of over growth of the acetabulum with gradual forcing of the head from the acetabulum. The final result was good, but this case is not reported in the older age category since it represents failure of an early arthroplasty.

Group II. 3-5 years of age

In this group there are 14 cases with 16 hips:

10 good

2 fair

2 poor

1 penetrated (in spite of this patient has almost normal range, but a positive Trendelenberg, and occasional discomfort.)

1 ankylosed (this was a poor result demanding additional surgery — infection ensued with ankylosis. This is our only case complicated by infection).

Group III. Over the age of 5

In this group there are 16 cases with 19 hips:

4 good

14 fair

1 poor

Our only postoperative death occurred in this group in a 10 year old child. The oldest patient operated was 13½, and this was a good result.

DISCUSSION

There are several complications to surgery. Among these were occasional aseptic necrosis of the femoral head, though except in rare instance this was present prior to surgery, and occasional penetration of the femoral head through the acetabulum due to excessive removal of acetabular floor.

Technical errors included excessive cupping or deepening upwards from the superior acetabular rim. This gave a good looking hip, but one poor in motion due to apparent entrapment of the femoral head. There were also cases that were not sufficiently deepened or could not be sufficiently deepened, and did not provide adequate head coverage. This is not always easy to determine on the operative table. There were some hip joints that looked good anatomically by X-ray, but when graded for range of motion, demonstrated a poor range. This apparently related to postoperative fibrosis.

In general, however, the X-ray appearance closely paralleled the range of motion. In other words if the X-ray showed a satisfactory acetabulum and femoral head, the range of motion was good and the Trendelenberg negative.

During the evaluation process it seemed evident that in general there was no change in grade after 2½ to 3 years of observation. A negative Trendelenberg remained negative. Good bony architecture continued to develop well, and range of motion was well maintained or improved. Only occasionally did the clinical picture worsen.

Conversely a poor hip at 2½ to 3 years remained poor with the same criticisms obtaining from that time forth, or the hip gradually developed pain.

From our study it seemed apparent that the hip operated from 2 to 5 will usually yield a

good result, while that operated after 5 on will usually give only a fair result. After the age of 5 the results with increasing years were quite comparable among themselves.

The greatest single difference after this age is the finding of a positive Trendelenberg in the older age groups. Range of motion is usually adequate, but stabilization is not. We do not know the ultimate fate of this group with a positive Trendelenberg, but there is every reason to believe that many of this group will eventually develop pain and tiredness in adult life. Of these some will be able to cope with the problem by decreasing their activity while others will require future arthroplasty or arthrodesis.

SUMMARY

The Colonna procedure is in general a good procedure for those children through the age of 5, and an acceptable salvage procedure after this age, though the really good results decrease sharply from this point forth.

The procedure re-establishes a normal or practically normal Y-coordinate and gives adequate head coverage with a normal acetabular inclination that is well maintained through growth and development. Its chief advantages over a shelf are adequate depth of acetabulum and the improvement of the Y-coordinate which materially shortens the long lever arm from the center of gravity to the center of the femoral head.

It seems evident that any previous surgical procedure that has resulted in a decrease of available capsule for head coverage at the time of arthroplasty will prejudice the result, for fascia lata is not the equal of capsule for head coverage.

For this reason it is our opinion that if a surgical procedure is to be undertaken, and a Colonna procedure is considered as an ultimate solution to the problem, that the Colonna procedure be done as a primary hip procedure. Thus will time and arthroplasty material be saved and both are important to a successful outcome.

In the younger age group we consider it an ideal solution to the problem of congenital hip dislocation, that is not amenable to closed reduction before the age of 3 and, in general prefer it to closed reduction or open reduction between the ages of 3 and 5.

Since we are still unhappy with many of our results in the older age group we are making use of several other techniques, dependent chiefly on the individual indications. These include such procedures as Pemberton's shelf procedure, acetabular rotation, and osteotomy of the ilium above the superior acetabular margin with medial displacement of the hip joint beneath the entire iliac wing. As yet these procedures have not been in use long enough to make evaluation possible.

The Colonna procedure is the operative procedure of choice in children to the age of 5. It is a useful procedure after this age in selected cases, and may eventually prove the best procedure available as a salvage procedure in the older age group.

The authors will continue to use it in this group, but because of its inadequacies will search for other procedures.

By individualizing the hip problems of the older age group some will be found suitable for the Colonna procedure, while others will be deemed more suitable for various other approaches.

We are all searching for the ideal and in all probability there will be no one ideal procedure, but as is generally true, as indications and criteria are delineated more clearly we shall find several equally useful procedures in this age group.

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The Solitary Circumscribed Primary Lung Cancer

A 5-Year Follow-up of 94 Surgically Treated Patients*

Corrin H. Hodgson, M.D.

Section of Medicine
Mayo Clinic and Mayo Foundation†
Rochester, Minnesota

John W. Vance, M.D.

Fellow in Medicine
Mayo Clinic and Mayo Foundation†
Rochester, Minnesota

This excellent paper by Doctor Hodgson gives the experiences at Mayo Clinic on surgical treatment for the solitary circumscribed lung cancer. Emphasis is made on early recognition and tomography so that a greater percentage of cure may be obtained. One hundred per cent operability is of particular note. Especial emphasis is placed on striving for further improvement in our diagnostic techniques.

(DWN)

ONE third of the solitary circumscribed nodules of the lung removed surgically are malignant tumors and most of these are not recognizable as such before operation. The urgent need for a dynamic attack on these dangerous nodules is apparent.

A simplified definition of a solitary circumscribed pulmonary nodule is as follows: A lesion seen on a roentgenogram of the thorax to be solitary, more or less circumscribed, intrapulmonary, and free of known complications or demonstrable metastasis. These nodules are due to many causes, including metastatic malignancy, but this discussion will be confined largely to the solitary circumscribed primary cancer of the lung.

Within the memory of many of us, we have

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†The Mayo Foundation, Rochester, Minnesota, is a part of the Graduate School of the University of Minnesota.

changed from believing cancer of the lung to be rare to considering it the number one cancer killer. Whether this change is apparent or real is not a settled question, but there is no doubt that the disease is being recognized with ever-increasing frequency.

DETECTION AND DIAGNOSIS

Before we can attack these lesions, we must first recognize them, but once found, to diagnose them clinically is usually difficult. When symptoms from cancer of the lung appear (cough, expectoration, or hemoptysis), they are nonspecific and lead to a diagnosis only because they bring the patient to the physician. Peripheral carcinomas, unfortunately, cause symptoms only when there are complications such as bronchial obstruction, invasion of adjacent structures, or metastasis. Because the parenchyma of the lung and the visceral pleura are devoid of pain fibers, pain can be produced only by ex-

tension of the growth beyond the lung and is, therefore, a late symptom.

Age and sex have a dominant role in cancer of the lung, but in determining the cause of a lesion in any one person they are often misleading.

The Clinical Laboratory. — The clinical laboratory, which is helpful in many diseases, is of little use. The results of bacteriologic studies of sputum, secretions, and gastric content are often negative even when there is active infection within a peripheral circumscribed granuloma. Cultures for *Brucella* and fungi require only 2 to 3 weeks, but cultures for tuberculosis may require 6 to 8 weeks for completion. It is not advisable to wait for the outcome of these studies when faced with the possibility that a malignant tumor is present which already may be shedding tumor emboli into invaded blood vessels. Skin tests must not induce one to postpone thoracotomy, nor should one forget that there is no skin test for pulmonary cancer.

Roentgenography. — The greatest single help in bringing the lesion to our attention is, of course, the thoracic roentgenogram, and it is particularly valuable during the important period before symptoms develop. Community surveys, routine thoracic roentgenograms on admission to hospitals and physicians' offices, and roentgenography for all patients with symptoms disclose many cases of cancer of the lung every year. Thoracic roentgenography must include more and more people in the groups with highest incidence of cancer. Among persons who have been examined, the frequency with which cancer of the lung is discovered by the roentgenogram depends on the age (more frequent after 45 years), on the sex (much commoner among males than among females), and on respiratory symptoms (oftener among those who have than those who do not have such symptoms).

Brett(1) reported two interesting thoracic roentgenographic surveys for comparison. One unit, which was engaged in a routine survey of apparently healthy men, yielded findings of pulmonary cancer at the rate of 27 per 100,000 persons examined. The other unit examined patients referred to it by physicians, and many of these people had symptoms. The rate of detection of

cancer in this group was 267 per 100,000 persons examined or 10 times the yield of the other unit.

Other roentgenographic surveys by Bondi and Leites(2), Guiss(3), Seiler and associates(4), and Boucot and associates(5,6) have shown the rate of detection of pulmonary cancer to vary from 13 to 422 cases per 100,000 persons examined. The great differences are largely due to factors of selection of patients examined.

In community-wide X-ray surveys, which include people of both sexes and of all ages, the yield of cancer cases is very low. It is not worth while, therefore, to conduct community surveys only for detection of cancer of the lung, but rather in conjunction with campaigns for tuberculosis and heart disease.

The number of cancers which are solitary and circumscribed that are found in these surveys will, of course, be small in comparison to the whole. Holin and co-workers(7) found solitary circumscribed nodules of all types in one of every 1,000 patients examined; of all lesions found only 3 per cent proved to be malignant lesions, which gave an average of three per 100,000 patients examined.

The roentgenogram is of great help in the detection and localization of a solitary circumscribed lesion but, unfortunately, it does not afford conclusive evidence for the final diagnosis. It is of assistance in ruling out malignant tumor in the following circumstances: (1) if the lesion is regressing, (2) if it was present on available roentgenograms taken a number of years previously and remains without enlargement, and (3) in certain instances of calcification.

A regressing lesion obviously is not cancerous, but few solitary circumscribed nodules regress. These nodules should never be "watched" by means of periodic roentgenograms, because the fatal spread may occur during the period of watching. A few cases are on record of cancers that have remained unchanged for 3 or more years. These are more apt to be adenomas of the bronchus than carcinomas. But the likelihood that a malignant tumor will remain stationary for 3 or more years and the likelihood that it will still be resectable and curable are

both so slight that discretion should be used before recommending the removal of nodules present without change for a number of years.

Calcification can be of definite help in ruling out malignancy in certain instances. "Laminated," "onionskin," or "target" type of calcification is present in a granuloma only and never in a neoplasm; "popcorn" type of calcification, when recognized, practically always signifies a hamartoma. On the other hand, the presence of calcification within the lesion also may be misleading: When there are multiple calcific shadows scattered throughout the lung, by mere chance one of these might have been engulfed within a malignant tumor; also, calcification is so common in the hilar regions it might well be included in a solitary circumscribed cancer in this location. A few cases of calcification within solitary circumscribed cancers have been reported but they are indeed rare.

O'Keefe and associates(8) made roentgenograms of surgically removed solitary nodules. Seventy-two were malignant lesions, and 13.9 per cent of these showed the presence of calcium on a roentgenogram of the surgical specimen itself but only one showed calcification on the preoperative clinical roentgenogram. The probability of a solitary peripheral cancer containing roentgenographically demonstrable calcium is so small that one should think twice before recommending the removal of nodules containing calcium. For each lesion that turned out to be cancerous many benign lesions would be removed with the attendant discomfort, expense, and risk.

The importance of calcification within the lesion and the superiority of tomography in demonstrating it require that practically all patients with a solitary circumscribed pulmonary nodule have a tomographic examination before thoracotomy if calcification or malignancy is not otherwise established.

Bronchoscopy. — Because of the peripheral location of these cancers, they often are not seen bronchoscopically and tissue for diagnosis is seldom available. The greatest usefulness of bronchoscopy is in obtaining secretions and washings for cytologic examination and culture.

Pathologic Aspects. — The greatest single help in confirming the preoperative diagnosis of solitary circumscribed cancer is, of course, the tissue laboratory. It provides our only means of knowing precisely with what we are dealing. Bronchoscopic biopsy will provide tissue for diagnosis only occasionally. We are largely dependent, therefore, on the examination of bronchial material (secretions, washings, or sputum).

In the over-all cytologic examination of bronchial material from patients with carcinoma of the lung, findings in approximately 65 to 70 per cent will be positive, but this high rate will not obtain in cases of solitary circumscribed peripheral cancers. The efficacy of the method is dependent on the submission of a satisfactory number of specimens (three or more), the quality of the material (bronchial sputum and not saliva), the cell type of the cancer, and somewhat on the location of the tumor (less effective in peripheral cancers and metastasis). This method also is limited, because some patients are unable to produce sputum; but one of the brighter hopes for the preoperative diagnosis of pulmonary cancer by cytologic methods comes from the recently published work of Allan and Whittlesey(9).

These workers discovered that by the judicious inhalation of sulfur dioxide, 98 per cent of patients without cough or expectoration could be made to produce enough sputum for examination. Of great significance is the fact that of 64 patients with cancer of the lung who could not produce sputum without sulfur dioxide, all of them expectorated satisfactory specimens by the sulfur dioxide method, and 63 of the 64 were found to have carcinoma cells. Of eight patients with "coin" lesions due to cancer, five, or 62 per cent, were found to have carcinoma cells after the use of sulfur dioxide. This may prove to be a definite technical improvement in the early detection of cancer of the lung.

Because sputum for cytologic examination is easily collected in a preservative and requires no special handling until it arrives at the cytology laboratory, it promises to become a more universal procedure for patients of cancer age, especially for those with respiratory symptoms or with roentgenographically demonstrable lesions in the lung.

Thoracotomy. — If the cause of a solitary circumscribed lesion of the lung cannot be established or its benignity proved, diagnostic thoracotomy is indicated. In a majority of cases this will prove to be the crucial diagnostic procedure. Because thoracotomy usually proves to be therapeutic as well as diagnostic it will be discussed further under therapy.

TREATMENT

Roentgen Therapy and Chemotherapy. — So few patients having solitary lesions have been treated only by roentgen therapy or by chemotherapy that no recommendation is warranted regarding these forms of treatment. Whether or not these methods are superior, equal, or inferior to surgical removal of the tumor cannot be said.

Surgical Treatment. — The majority of solitary circumscribed cancers are now treated by surgical removal. Because thoracotomy is usually necessary to establish the diagnosis and to determine the extent of involvement, it is generally feasible to remove the tumor at the same operation if possible. This may require lobectomy or pneumonectomy. By the very definition of the lesions, all solitary circumscribed pulmonary cancers should be operable provided the patients' general condition permits such treatment. This 100 per cent operability compares to 50 per cent operability for all types of bronchogenic carcinoma. Approximately 90 per cent of the solitary lesions (96 per cent, Paulson[10]) are resectable whereas only 30 per cent of all types combined are resectable. Therefore, from the surgical standpoint, we are dealing with the most favorable kind of pulmonary cancer.

Whether thoracotomy will continue to merit

our trust as the best means of treatment will depend on the results. We have studied the survival of our patients with solitary circumscribed cancers of the lung and are presenting an additional report of the results of surgical treatment.

THE STUDY

Previously, Vance and associates(11) reported a 3-year follow-up study of 94 patients with solitary circumscribed bronchogenic cancer who were treated surgically. Our present report is a 5-year follow-up study of these same patients, 100 per cent of whom were traced. If we eliminate from the 94 patients those who were explored but found inoperable (nine cases), those who had palliative resection only (three cases), and those who died in the hospital after operation (five cases), 77 remain who underwent resection with the hope of cure and survived operation. Of these 77, 26 or 33.8 per cent were living after 5 years. In the series of bronchogenic carcinoma of all types reported for the Mayo Clinic by Kirklin and associates(12), 37 per cent of the patients who were resected with the hope of cure survived 5 years. It is discouraging, therefore, to learn that the survival rate of patients having resection with the hope of cure is no better for those with solitary circumscribed cancer than for those with other types of cancer. This is contrary to the impression commonly held.

However, the resectability rate in our group (90 per cent) is nearly twice as great as that in the series reported by Kirklin and associates (49.8 per cent); so the survival rate for all surgical patients with circumscribed cancer is nearly twice as good as that for patients with other forms of surgically explored bronchogenic carcinoma.

TABLE 1
Curative Resections for Solitary Circumscribed Pulmonary Lesions Due to
Bronchogenic Carcinoma: 5-Year Survival Rates According to
Cell Type (77 Patients)

Lesion, cell type	Patients	Lived 5 or more years after operation	
		Number	Per cent*
Adenocarcinoma	26	9	34.6
Large cell	25	8	32.0
Squamous cell	19	8	42.1
Small cell	1	0	—
Unclassified	6	1	16.7
Total	77	26	33.8

*Inquiry as of January 1, 1960. Hospital deaths are excluded in the calculation of survival rates.

Survival rates according to cell types are given in table 1. There seems to be little difference between the three most numerous types: adenocarcinoma, large cell tumors and squamous cell tumors.

Survival rates according to different variables are given in table 2. It seems to make no difference whether thoracic symptoms are present or absent, whether the lesion is greater or less than 4.0 cm. in diameter, or whether the sedimentation rate of erythrocytes is greater or less

than 30 mm. in 1 hour. The survival rate is more favorable if the cytologic findings are negative rather than positive, and the chance of survival appears to be slightly better if the nodes are not involved than if they are involved.

In this group of patients, 77 of the 94 had cytologic examination of bronchial material; the results in 31 (40 per cent) cases were positive. This finding is of definite help in making a pre-operative diagnosis. Tissue diagnosis was made in only seven (10 per cent) of the 67 bronchoscopic examinations performed.

TABLE 2
Curative Resections for Solitary Circumscribed Pulmonary Lesions Due To
Bronchogenic Carcinoma: 5-Year Survival Rates According To
Different Variables (77 Patients)

Variable	Patients	Lived 5 or more years after operation	
		Number	Per cent*
Total	77	26	33.8
Thoracic symptoms:			
Present	45	15	33.3
Absent	32	11	34.4
Size of lesion:			
4.0 cm. or less	43	14	32.6
More than 4.0 cm.	34	12	35.3
Sedimentation rate (mm. in 1 hour):			
30 or less	39	14	35.9
More than 30	25	9	36.0
Unknown	13	3	23.1
Cytologic findings:			
Positive	20	5	25.0
Negative	44	19	43.2
Unknown	13	2	15.4
Operation:			
Pneumonectomy	41	12	29.3
Lobectomy	36	14	38.9
Nodal involvement:			
Present	34	10	29.4
Absent	40	15	37.5
Unknown	3	1	33.3

*Inquiry as of January 1, 1960. Hospital deaths are excluded in the calculation of survival rates.

COMMENT

Much emphasis has been placed on the early detection and surgical removal of cancer of the lung, and at present our hopes are largely confined to these two fields. It is therefore of great interest to study the solitary circumscribed pulmonary cancer because it affords the best chance to make an early diagnosis and to remove the lesion. Therefore, it should be the most favorable type of cancer of the lung.

A question of some importance is whether or not there is any fundamental difference between the solitary peripheral and the central carcinoma of the lung. In our group of patients having solitary circumscribed cancers, the ratio of males to females was 4:1; this was also characteristic for all types of bronchogenic carcinoma. The average age of the patients (58.7 years) conformed to the general pattern. In comparing the cell types of our circumscribed lesions with the cell types in all types of bron-

TABLE 3
Cancer of the Lung: Comparison of Cell Types in Solitary Circumscribed Lesions and in All Types of Carcinoma

Cell type	All types carcinoma(12), per cent	Solitary circumscribed carcinoma(11), per cent
Large cell	37.9	32
Adenocarcinoma	12.6	31
Squamous cell	33.7	27
Small cell	15.8	3
Unclassified	—	7
Total	100.0	100

chogenic carcinoma as reported by Kirklin and associates (table 3), it would appear that the percentage of large cell and squamous cell carcinomas is roughly the same in the two groups, but there is a higher percentage of adenocarcinoma and a smaller percentage of small cell carcinoma in the group having solitary circumscribed cancers. The significance of this is debatable because of the small number in the latter group (94 cases). The difference in resectability rate between peripheral and other types of lesions is large, but the survival rates of the two groups of resected cases again point to a similarity. From this study we cannot conclude that there are any significant differences between the two types of lesions, the greatest difference perhaps being the relative age of

the tumor when the patient was first seen.

Figure 1 shows the roentgenogram of a patient on admission to the Mayo Clinic. The atelectasis of the right upper lobe suggests a central type of bronchogenic carcinoma and if this had been the first roentgenogram one would so conclude. However, a roentgenogram taken previously elsewhere (Fig. 2) shows this to have been a solitary circumscribed peripheral type of cancer at an earlier stage of its development.

It is encouraging that 90 per cent or more of solitary tumors of the lung are resectable, but it is equally discouraging that the 5-year survival rate in cases of resection with the hope of cure is only 33.8 per cent, a poor showing

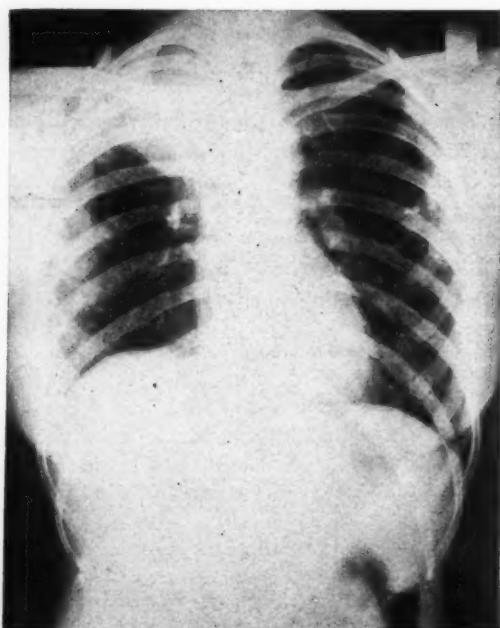


Fig. 1. Roentgenogram made on patient's admission showing atelectasis of right upper lobe due to "central" carcinoma.

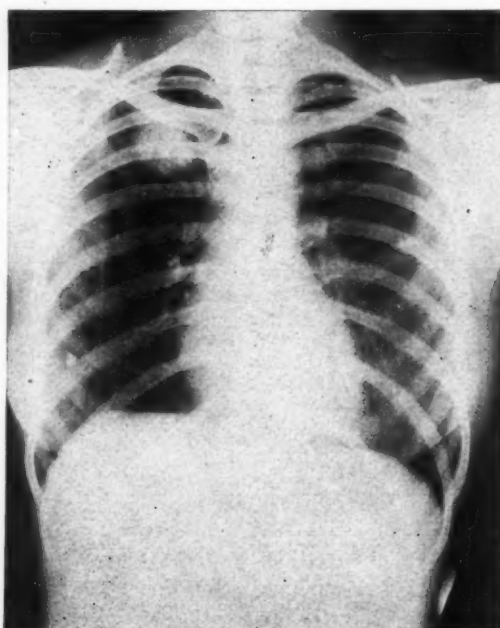


Fig. 2. Roentgenogram made about 11 months before figure 1 showing lesion to have been solitary and circumscribed.

for this highly selected, supposedly favorable type of lesion. This is a survival rate of 27.7 per cent for the 94 cases of solitary circumscribed cancers studied. According to most reports in the literature, 95 per cent of patients with bronchogenic carcinoma of all types combined will be dead of their disease within 5 years of the time of its discovery. Even if we could detect and remove all lesions while they were still in the favorable solitary circumscribed state, only about a fourth of the patients would reach the 5-year goal, according to our studies.

Better methods must be developed before the outlook will improve and, until then, we are committed to make the best use of what we have: We must continue roentgenographic surveys among those with the highest susceptibility to cancer of the lung (men more than 45 years of age). We must interpret the roentgenograms carefully and investigate thoroughly every case in which a lesion of suspicious nature has been encountered. We must evaluate carefully each patient with respiratory symptoms, and we must extend our use of sputum cytology. We should make frequent use of diagnostic thoracotomy for patients with pulmonary lesions of unconfirmed diagnosis. Aside from this, we have palliative and supportive therapy for the patient who cannot be cured (an important part of our treatment of cancer of the lung), and we have hope for improvement in the future.

Regarding the future, in a forthright article on the treatment of cancer of the lung, Bignall(13) concluded with the following state-

ment: "But it seems likely that no major improvement in the results of treatment will appear until some method is found of bringing the uncontrolled 'cancerous' growth back under control." And only by recognizing the inadequacy of our present means can we be inspired to search for improved methods of treating cancer of the lung.

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Medical Schools in the United States at Mid-Century is a factual analysis and evaluation of medical education in the United States at the mid-point of the 20th century. Edited by Dr. John E. Dietrick, Dean of Cornell University Medical College, and Dr. Robert C. Berson, Dean of the Medical College of Alabama, the volume, which has been out of print, comprises the formal report of the Survey on Medical Education, organized in 1947.

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The President's Page

Doctor and Lawyer

Lindsay E. Beaton, M.D.



Lindsay E. Beaton, M.D.

It is an inauspicious reflection of the intellectual divisions of our age that the two great learned professions, medicine and law, find so small an area of common understanding. Perhaps a physician's interpretation of the variance in views may illuminate them so that they can be seen and seized, and it may evoke its counter-

part from some member of the bar. The two at least meet in the professional ideals of service to the public and rigorous adherence to the standards of one's peers. Doctor and lawyer are also equated in public esteem, the former perhaps more affectionately considered, thanks to the nature of his offices to the sick, the latter more admired for his rational keenness. Both are regarded by the laity with some awe, but at times, and too often of late, with ambivalence, indispensable for their special skills, but mistrusted because of their socio-economic status, their individualism, and their esoteric knowledge. Each would do well to look to his public

image, as an integral part of vocational responsibility, since only the trusted professional can fully answer the needs of those who come to his door.

There are, of course, defining differences between law and medicine, and the chief of these is the fact that they play separate roles in civilization. Historically, at least in this country, the attorney has been the architect of government, the deviser of the corporate structure of our economic life, and the arbiter of societal regulation. He guarantees that the individual citizen receives the full benefit and protection that the law has to offer but he always remains an officer of the court. More significantly he ensures that society remains controlled. The physician's focus is not the same; he is responsible not for society but for the individual. Even in his public health role he cannot escape the imperative of solicitude for the single sick man. If lawyer and doctor understood more explicitly the social function of the other, each would be more tolerant.

It is not surprising that the two professions attract men of dissimilar temperament. The attorney needs attributes of impersonality and detached objectivity, the ability to reify relationships so that the law can deal with them. The physician on the other hand must be a man who

can empathize and be at bottom his patient's passionate partisan. This is no place to go into explanations of the development of the two characters. They do exist, and the contrast accounts in part for the gap that divides their points of view. Their educations further split them. Law school, with its emphasis on case study, its debunking of judicial opinion, and its skeptical attitude toward legal absolutes produces a relativist. Medical school is much less iconoclastic, and the physician in embryo learns to think in mutually exclusive terms, health and disease, cure and failure. The medical student is taught approved techniques and treatments in an authoritarian way totally foreign to the indoctrination of the law student. His training contributes to the physician's displeased puzzlement that there is no legal certainty, no undisputed formula of right and wrong, while the attorney finds the doctor's expectation naive.

The difference between the attorney's impersonal intellectual grasp and the physician's sympathetic concern is not a new observation. It would seem to account for the amusing comment of Thomas Fuller, a 17th century English clergyman: "Commonly, physicians, like beer, are best when they are old; and lawyers, like bread, when they are young and new."

One way to attack the misunderstanding is not directly by an account of the ideals and realities of each profession, but instead by analysis of the perversities that each sees in the other. Let me start with the complaints that doctors have against lawyers. A physician does this with trepidation. In 1959 a Nebraska attorney filed suit against a visiting prominent orthopedic surgeon for \$500,000 for slandering the legal profession in a speech before a medical society. Both the local bar and the medical society regretted the action, but the doctor had already taken the precaution of returning to his home state, and no service could be made on him. I have no place to go. So the prudent and trembling pen let me first set forth some of the accusations of the doctor against the lawyer, and in each case the defense that the latter might reasonably offer.

To begin, probably nothing so contributes to the physician's distrust of the attorney as the

rising frequency of malpractice suits. The doctor believes that the lawyer fosters disgruntlement in the client who comes to him with some question about medical care. He feels that he is being persecuted in court and morally condemned. He decries a tendency for judges to rule more and more medical accidents as patent acts of negligence not requiring professional testimony for proof, under the doctrine of *res ipsa loquitur*. He fears that next the rule of warranty will be applied to him and that he will be sued every time the issue does not meet textbook perfection, on the unspoken grounds that with the "miracles" of modern medicine every patient has a right to anticipate complete restoration of health without running any risk. Knowing the variety of illness and the inexactness of treatment, the physician finds all this a deluding fantasy. And he points with real distress to the fact that some of his colleagues refuse to employ advanced therapeutic techniques to avoid the possibility of being sued. Finally he would probably say, if you pressed him, that to him the law seems like an abstraction related neither to social reality nor to the reality of the patient's health. Fortunately this is an area in which rapprochement is being sought, and we will discuss it, but the lawyer can still reply that every person deserves access to the services of counsel if he feels that he has been done an injury. He would deny that, except for notorious ambulance-chasers, attorneys encourage the filing of malpractice suits, and in Arizona he could support the contention. And lastly he would maintain that a malpractice action is not an arraignment for wrong-doing; it is merely an allegation of error in the course of treatment with consequent damage to the patient. The doctor carries malpractice insurance, the lawyer would add, just as he insures himself against other forms of human error, about which he is not so sensitive because they do not touch his professional self-esteem.

Next, the physician calls attention to the field of personal injury law, in which he sees high verdicts for incapacitations that he considers minimal and at times non-existent. The reply of admission of some gross inequities would be tempered by the fact that measures are being planned to correct them and by the observation that the open-handedness of some juries is one of the calculated risks of a democratic legal system and a small price to pay. The plain-

tiff's advocate would stress sharply that maiming and loss of life certainly deserve substantial compensation from a negligent party, that large awards are necessary to meet the realities of the expenses of modern living and medical care, and that the proper answer does not lie in newspaper ads by insurance companies blasting jury generosity but rather in the recognition that more adequate insurance coverage is required. He might go further and postulate that the physician's upper class status identification leads him to rise automatically to the defense of the insurance company, because he is unconsciously threatened by the implication of assault on his own economic group.

As an ancillary charge against the present pattern of personal injury trials, the doctor aims a denouncing finger at the medical harm done through delay in reaching a determination because of what he would characterize as legal red tape and the pettifogging maneuvers of attorneys. I doubt that any reputable observer would fail to deplore the damage done a claimant by clogging delay in the courts, but the lawyer would say that what the doctor regards as undue deference to the rituals of jurisprudence is only the discharge of the law's promise to protect the rights of the individual. He would add that measures are being urgently devised to speed the clearance of court calendars. A recent issue of the *Annals of the American Academy of Political and Social Science* was devoted to the topic of "Lagging Justice," and it contains encouraging discussion of the many methods being used and contemplated. Here the simple statement will suffice that lawyers are more aware of the problem than doctors and that rectifying steps are being taken.

The psychiatrist particularly would next criticize the lawyer for adherence to medieval concepts of mental illness and of free will and personal responsibility. The McNaghten rules, by which most criminal cases involving mental illness are still decided, are actually meaningless in terms of modern psychiatry. As a matter of fact, an American psychiatrist, Isaac Ray, attacked these concepts as long ago as 1838, and the Durham decision of the Court of Appeals for the District of Columbia in 1954 recurred to Ray's concepts in establishing a more scientific rule for the determination of mental

competency. This decision is a modern recasting of the New Hampshire State test of insanity, which has its origin in a judgment in that State in 1869. The precise point of this more enlightened and more moral thesis is that a person accused of a crime shall be adjudged innocent by virtue of mental illness if it is attested by competent psychiatric authority that he would not have committed his offense if he had not been mentally ill. As Associate Justice of the United States Supreme Court William O. Douglas has put it, "We of the Western world work on the assumption that a civilized society does not assess punishment where it cannot ascribe blame." What is the attorney's answer to this indictment? This is a question I cannot answer for him. I can only assume that he would respond in terms of the overriding necessity of removing the potentially dangerous person from the streets, and the peril of permitting a legal loophole through which an undisciplined man can escape the consequences of his actions, to the ultimate detriment of the social fabric. The probable fact is, from the psychological view, that the attorney is bound by the terms of his profession to deal within an intellectual framework that has nothing to do with the question, which is one of understanding the ways in which thought and action are governed by unconscious emotional forces over which the individual has no useful control.

Other instances of cultural lag in the adjustment of the law are also disturbing to the physician. For example, he finds it hard to stomach many sumptuary statutes, which he blames on the lawyer, perhaps in tacit recognition of the fact that in the legislature or on federal commissions the lawyer is the law-maker. I refer to such ordinances as those concerning sexual offenses, narcotic addiction, birth control, and adoption, which the physician would regard as scientifically out of date. He finds the lawyer too slow to accept modern medical fact. For example, in a paternity case in Ohio in 1958, after blood tests had definitely proved that the accused could not possibly have sired the child in question, the trial judge in the juvenile court could still give the following instruction to the jury: "Giving full weight to all factors, has the complainant succeeded in proving the guilt of the defendant by a preponderance of the evidence — notwithstanding the testimony of the

expert serologist that the blood-grouping tests establish the exclusion of the defendant as the father of the child?" If there is an answer to this accusation it would probably be that the law properly depends on precedent and that it is socially necessary to make haste slowly, since the law must remain hitched to the accepted opinions of the community and it takes time for the community to absorb sophisticated scientific ideas. Another instance is the allowance by judges of awards for cancer alleged to have been caused by injury, though this popular impression is against all medical evidence. Dr. Lionel S. Auster of New York estimates that only about six out of every 100,000 cases of neoplasm show even the slightest possible relationship to injury and notes that experimentally it has never been possible to produce a tumor by a single trauma. The law's faith in the efficacy of capital punishment is another example. For an ethical refutation one has only to read Jerome Frank's "Not Guilty" or Arthur Koestler's "Reflections on Hanging." The psychiatrist adds that there is no deterrent effect by capital punishment, as abundantly proved by many sets of statistics, and that the need to inflict such penalty has its roots in the unconscious constraint to control hostile impulses within ourselves and to dispose of our own hidden guilts. The law might contest this, sworn as it is to a doctrine of free will that modern psychology cannot accept. The attorney would perhaps defend the institution of capital punishment as a traditional defense against the chaotic forces in civilization, with the unspoken fear that without this extreme recourse people would run amok in aggressive crime. With all obeisance to the position of a fellow professional, the psychiatrist is still bound to state that the irrationality of capital punishment is clear and that there can be no argument about it. In fact, as many lawyers as physicians are in the van of the fight to abolish it.

The doctor's last expostulations to his brother the lawyer involve the general techniques of the law, and the reply would be that these merely highlight the doctor's ignorance of the legal craft. With his high regard for an absolute answer the physician is likely to look to the law as a final arbiter in regulating social health. He does not see it as realistically as does the attorney, who apprehends a self-contained professional system, a set of precedents, often fictional

and sometimes mystical, but well adapted to the practical needs of society for decisions that will fit the accepted beliefs of the time and will keep both private and public business oiled and moving. The doctor often can literally not comprehend the idea of the adversary proceeding as a method of arriving at truth. Its partisanship outrages him. The lawyer will answer that no fairer means has been found and that a public encounter, with all parties heard, is the only known safeguard against legal tyranny. The physician objects that he cannot credit a contingency fee arrangement, which by the tenets of his calling is wildly unethical. The attorney replies that unless he is willing to make this personal bargain the poor could never obtain their day in court. The doctor, like other legal laymen, finds it hard to understand how a lawyer can consent to represent an accused man whose guilt seems manifest. The lawyer responds a little wearily that no one is guilty until so proven and that in the meantime he has a democratic right to the best defense that society can provide. The history of America is full of examples of lawyers who were courageously willing to plead the cause of the unpopular. As early as the days of the Boston Massacre, John Adams and Josiah Quincy, Jr. served as counsel for a British captain who had participated in that action. Doctors, with their reverence for professional expertise, are sceptical to the point of contempt about the jury system. But attorneys see it as one of the guarantors of liberty, as Sir Patrick Devlin has called it, "the lamp of freedom". Furthermore it can be supported as a symbol of democracy, the citizen's chance to participate in the process of public order, and the way by which the harshness of the inherited law is softened and brought into contact with present social reality. As Judge Charles E. Wyzanski, Jr. of the U. S. District Court of Massachusetts has stated it, "Traditionally juries are the device by which the rigor of the law is modified pending the enactment of new statutes." In destruction of the physician's expressed preference for decision by the judge alone probably no one has put it more succinctly than G. K. Chesterton, when he said, "I would trust twelve ordinary men, but I cannot trust one ordinary man." Finally the doctor is more than a little impatient with insistence on legal procedure; with his training in the absolutes of medicine he values only the substantive law. Here the lawyer might

respond with some exasperation that the whole saga of western civilization disposes the fact that historically freedom was won by claiming for everyone the right to impartial legal procedure, to "due process", and that the means of the courts not the words of the law have proved to be man's protection against dictatorship and his insurance of personal liberty. The attorney is much less impressed with judicial decision than the legal layman, but he is much more impressed with the procedures that pledge to every citizen his fair chance in open hearing. Thus results the paradox that the lawyer, a sworn officer of the court, is little awed by legal authority.

Let us now trade interrogator and respondent in our Socratic dialogue. What are the lawyer's complaints about the doctor? First of all he would say that the doctor refuses his duty as a citizen when he will not testify against other doctors in malpractice suits. Here there is certainly some substance. The public widely believes this to be the fact. Harry Golden, the newspaper editor and columnist, recently noted that the loyalty of doctors to each other is "immense." In contrast he says, "Perhaps because of the nature of their work lawyers are a little more sceptical about colleagues." At least in Arizona, recent developments take some of the force out of this accusation, as will be remarked below. The plaintiff's counsel thinks he finds a similar disinclination on the part of the physician to testify against a large corporation or insurance company, some going so far as to grumble that they have difficulty in obtaining testimony. This they would blame on the class identifications of doctors and their unconscious defense of other members of their social group. There is some justice in this imputation. The physician as a good citizen should always be willing to make his knowledge available to the courts to assist in a just disposition of disputes, even at the cost of his time and occasional personal discomfort.

Some attorneys have objections to high fees charged by physicians for expert testimony, to which the doctor too often feels that he makes adequate reply by gibing at the lawyer's contingency percentage remuneration. It is hardly an answer to imply that both professions have some kind of right to mulct the public. We should regard our courtroom appearances as another pro-

fessional service, to be charged for on the basis of how much the time spent would have brought in our practices. The attorney also has a cynical conviction that doctors can be bought to represent either side. The ethical physician replies that this is true only of the "specialist" in expert testimony, and that the honest doctor abhors this practice and will only give a medical opinion as he sees it. This seems a fair answer. Part of the difficulty in varying viewpoints on the proper position of the expert medical witness is a semantic one, for the doctor conceives of "cause" far differently than the lawyer. He seeks the ultimate determinant, not the precipitant, since he is bound by his need to think in terms of therapy and not in terms of assigning blame. And in a nice switch on the pragmatic lawyer, the physician adds that medicine too is not an exact science and that the notion of "reasonable medical certainty" is often totally inapplicable to his determinations.

Perhaps most of all the lawyer would, in the private company of his confreres, inveigh against the doctor's smug arrogance about the law, which leads him to sweeping pronouncements that merely display his ignorance of the historical process that has erected the modern legal structure and of the sustaining role that it plays in our culture today. To this there seems to be no rebuttal except the physician's willingness to be edified and the lawyer's willingness to teach him. It is painfully clear that the attorney has been more inclined to learn about medicine than the doctor has been to learn about the law.

Ending the debate and proceeding to the concrete conclusions it suggests, one might first indicate ways in which the physician can contribute to better use of medical knowledge in the courtroom. First, he should prepare more accurate definitions of incapacitation after injury. A start has been made on this through various guides being published under AMA auspices. Second, he can clarify the problems of mental status and use his influence to see that enlightened modern legislation is enacted. He can, third, repair his own lack of co-operation by manifesting willingness to testify in court in either malpractice or personal injury cases. And last, he can, on invitation of the local bar association, contribute to the education of lawyers. By this I do not mean acquainting the lawyer

with medical interpretations that will enable him to get juicier verdicts or, conversely, to nullify a justified award completely. I mean some basic education in the true facts of health and disease and the welfare of the sick and injured.

The lawyer on his side also can reduce this controversy between the professions by the indoctrination of the physician in the law and by acting to bring the law closer to scientific medical fact and social need. He can first, through the local medical society, slowly bring the doctor to some understanding of the necessary conventions of the law, discuss the pros and cons of the jury system, and teach the lesson that apparently obstructive procedures are truly the citizenry's traditional shield against legal or governmental despotism. The bar is actively exploring ways of reducing trial delay and of adjusting personal injury law to social reality. One plan in the latter area is the substitution of the concept of comparative negligence for that of contributory negligence by which a plaintiff is prevented from recovering damages if his own negligence has contributed even in a minor degree to causing the accident. The comparative rule would merely decrease the award by the percentage that is accounted for by the plaintiff's negligence. Another device is the reduction of automobile liability suits by instituting a compensation plan similar to workman's industrial insurance, recognizing that motor vehicle accidents are an inevitable concomitant of a mechanized society, and proposing that a fund be set up from which scheduled awards would be made, regardless of fault. It is not too far a cry to extend this principle to all injuries. Perhaps this would be regarded as a limitation on the personal liberty to seek redress, but the doctor would regard it as a release from the nonsense of damage suits. An option could always be included that would allow individual recovery at law under certain circumstances, as in Arizona's Workmen's Compensation Act.

Finally there are several projects on which doctors and lawyers can work together. One that is already being successfully pursued in this state is the medico-legal pretrial panel that investigates malpractice cases before they are brought into court. This was inaugurated in Pima County as the joint conception of Dr. Ian Chesser and Mr. Robert Leshner and has been widely

admired throughout the country. It provides greater legal security to the blameless physician; it also gives the attorney, if he has a justifiable case, access to unimpeachable medical testimony. In practice to date it has prevented almost all malpractice disputes from coming to the public attention of an open trial and has thus served both the innocent physician and the patient, who learned that his grievance was mistaken. In a similar way lawyers and doctors might unite to achieve wider use of the impartial medical witness as *amicus curiae*, the court-employed expert. This system is now being tried in many parts of the United States. Physicians welcome the idea; with their concepts about disease, it is much more acceptable to testify without the taint of partisanship. Lawyers too have accepted the scheme, though there are dissents. Some have protested that its fundamental basis is faulty because it assumes that medicine is an exact science, whereas it is well known that competent and honest experts will disagree on the interpretation of identical medical facts. Calling a doctor impartial does not mean he is right, observes Elwood S. Levy of Philadelphia, and yet the court appointment cloaks him with infallibility. The procedure is further objected to as doing violence to the adversary proceeding, which is small loss in the physician's eye. There is, however, substance in the contention that the system of the court-appointed expert substitutes trial by a single witness for trial by jury.

There are many other problems on which lawyers and doctors can and should by choice employ a bidisciplinary approach. Among them are penal reform; the efficacy of various kinds of punishment; the teen-age criminal, the so-called juvenile delinquent, who is merely an underage person who breaks the law; and better use of modern knowledge of behavior in juridical dispositions. In fact the entire theory of criminality demands a new legal interpretation in the light of the findings of modern social science and psychiatry. Changes are coming. The Durham decision is only one. The conclusions of the American Law Institute in 1955 that adultery should not be a statutory crime and that private homosexuality should also not be enjoined by law are other landmarks. In that session Judge Learned Hand, perhaps America's foremost jurist, commented, "Criminal law which is not enforced practically is much worse than

if it was not on the books at all. Sodomy is a matter of morals, and it is not a matter that people should be put in prison about."

Each of the two great professions could do no better than to attain the ideal that the other holds for it. The doctor expects the lawyer to stand for and achieve justice, and the attorney who finds this view naive and uninformed might do well to pause a moment and realize the trust that legal laymen put in him in the mere expression of this reliance. Perhaps it is time for the lawyer to lead the advance more rapidly toward social justice as the world anticipates it. E. S. Robinson in his book, "Law and the Lawyers," remarks that lawyers are a priesthood with prestige to maintain. "They must have a set of doctrines that do not threaten to melt away with the advances of psychological and social sci-

ence." It is time for abandonment of those ancient restrictions. The physician looks to the attorney to represent what David Riesman calls "the beneficent use of law in the public interest." And that is high compliment.

The doctor on the other hand is generally admired by the lawyer, who has an image of him as the selfless guardian of health and minister to the sick. The physician can appreciate the obstacles that come from a hierarchical inheritance, for medicine is directly descended from a priesthood. The doctor too can now abandon some of his outworn prerogatives and conventions and enter into the common arena. The attorney believes that the good physician will offer his science and his knowledge unstintingly in the service of public justice and public health. And that too is high compliment.

NEW DOCUMENTARY HISTORY OF MEDICINE

A non-commercial, capsule history of medicine — from ancient time to the present — has been produced by White Laboratories and is available for medical and lay group showings. Title of the film is "69.3".

This unusual title is derived from the theme of the film, which reveals how medical progress over the years has helped raise our average life expectancy at birth from about 20 years in ancient time to the present 69.3 today.

The film is narrated by Alistair Cooke, who gained fame on the TV series, "Omnibus," and was written by Irve Tunick, winner of the Robert E. Sherwood writing award. Dr. Robert L. Swain was technical advisor.

The documentary is a black-and-white 16mm film, and runs 13½ minutes. Requests for free bookings should be sent to: Institute of Visual Communications, Inc., 40 East 49th Street, New York 17, N.Y.



Season's Greetings

from

Arizona

Medicine



Editorial

GUEST EDITORIAL FEDERAL AID TO EDUCATION

It has always been said that but "two things are inevitable — death and taxes." If either of the two major political party platforms are carried out, as they were written, then two more inevitables will be added — socialized medicine and federal aid to education. Both of these, however, have no place in freedom-loving America.

In addressing the members of the medical profession of Arizona, I need not dwell on the evils and consequences of socialized medicine, but you may not be so well informed concerning the question of federal aid to education. So, without attempting to cover the field in detail

or boring you with too many figures and statistics, may I merely hit the high points of the national question and be a bit more specific in regard to the financing of Arizona's public schools.

There has been, of course, for years, a drive among our more socialist-minded educators and Washington bureaucrats for direct federal financing of the public schools; but, never before have the candidates for President, of both major political parties, advocated such a "welfare" step. The basic premise behind this drive, although not admitted as such, is "thought control." Loudly protesting against this fact though, our social-

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CONTRIBUTIONS

The Editor sincerely solicits contributions of scientific articles for publication in ARIZONA MEDICINE. All such contributions are greatly appreciated. All will be given equal consideration.

Certain general rules should be followed, however, and the Editor therefore respectfully submits the following suggestions to authors and contributors:

1. Follow the general rules of good English or Spanish, especially with regard to construction, diction, spelling and punctuation.

2. Be guided by the general rules of medical writing as followed by the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION.

3. Be brief, even while being thorough and complete. Avoid unnecessary words.

4. Read and re-read the manuscript several times to correct it, especially for spelling and punctuation.

5. Manuscripts should be typewritten, double spaced, and the original and a carbon copy submitted.

6. Exclusive Publication — Articles are accepted for publication on condition that they are contributed solely to this Journal. Ordinarily contributors will be notified within 60 days if a manuscript is accepted for publication. Every effort will be made to return unused manuscripts.

7. Reprints will be supplied to the author at printing cost.

(The opinions expressed in the original contributions do not necessarily express the opinion of the Editorial Board.)

ist welfarers shout that the individual states "NEED" and "must have" this assistance from the federal government in order to even catch up, let alone keep up, with the Communist educational system. But do we as individual states actually need — or better — can we afford such "Indian-giving?" Statistics show that the individual school boards have done a commendable job in these post-war years; for, while the school population has increased by approximately fifty per cent, the school boards have provided the school buildings to house these additional children, recruited the teachers to staff them, raised teachers' salaries and, in general, have provided for better schools today than in any previous time in history. This achievement has been brought about by a tripling of the public school expenditures — from \$4.3 billion in 1947-48 to \$14.4 billion in 1958-59. Most of this money has come from the property taxpayer, and we readily agree that he is carrying more than his share of the load. Obviously the cost of the public schools is going to continue to rise; it has been estimated that it will require a fifty per cent increase in the next decade just to accommodate the increased enrollment alone. Where is this additional money to come from? We say the large majority of it must come from the individual states. Why? Because they have a much wider tax base, and because in many instances the states have not been carrying their just load. This latter, we feel to be especially true in the case of our own state, where "big industry," by its stranglehold on our state legislature, has not permitted bills to pass that would have kept the state in line with her obligations.

Most proponents of federal aid agree that the additional financial aid should come from the state, but contend that the state isn't going to provide it; hence "we must turn to the federal government," whose bureaucrats are already trying to stuff it down our throats and will then tax us double for it. Oh, that we could but reverse our state and federal income taxes! The states should be allowed to keep a greater portion of their own tax revenues. However, in order to provide the money for the various federal subsidies, the federal government has pre-empted so many of the other tax sources from the state. The sound method to aid the schools would be to stop this vicious cycle of sending more and more money back to Washington, and getting

relatively less and less back in the form of "doles."

This could be accomplished by reducing the federal income tax and by repealing many federal taxes, particularly excise, giving the states a chance to reimpose as many of them as necessary. For instance, telephone and telegraph taxes raise \$700 million a year, federal tobacco taxes run to nearly \$2 billion, estate taxes \$1.2 billion, beer taxes \$800 million, etc. Their repeal would not affect the federal budget if the subsidies were unloaded at the same time. The release of the many federally controlled utilities and industries to the states, or to private ownership, would be another almost unlimited source of funds for the states.

When our Constitution was adopted, all powers not given to the federal government were reserved to the states. Education was one of these powers. In their wisdom, our forefathers provided that education should be decentralized. The states and local property taxpayers have thus provided for the education, down through the years, that has, in the relatively short span of our history, advanced us to the unquestioned position of world leader. But here again our well-meaning friends, who feel that only Washington can solve any of our problems any more, scream that because of the urgency thrown on our education system by the Russian sputnik and because of the almost unbelievable mushrooming of the school population, the states are no longer able to meet this crisis. Can this claim really be true in wealthy United States? The Committee for Economic Development, after a thorough study and extensive survey of the problem, concluded that federal assistance should be provided only for those states where there are extremely low personal incomes in relation to the number of school children. They further concluded that but thirteen states were in this category. However, it is further revealed that of these thirteen states, eleven of them were at least trying to support two separate school systems; one for the white and one for the colored. Should our tax money be used to support such an unconstitutional act? Further, when one scans the list of states with the below average personal income, one notes a number which have, instance after instance, induced industries to leave states where school

taxes were and are considered to be high and where all businesses pay their fair share of the taxes, to come to their states where they are promised tax moratoriums of some ten or fifteen years, or other such inducements. And still again our well-meaning friends will say, "But congress has already appropriated the money, and if we don't take our share, somebody else will use it." It seems never to occur to our liberal friends that money doesn't grow on trees (even in Washington); that we have a seemingly ever-mounting national debt; and that if something isn't soon done, not only to balance our national budget, but also to drastically reduce our national debt, our beloved country will no longer be the "land of the free," but rather the land of the slaves to a centralized bureaucracy in Washington.

Without federal aid, local school boards have built 680,000 classrooms since the last war and raised teachers' salaries ninety-nine plus per cent. A noteworthy accomplishment to be sure, but an accomplishment which has demanded more of a sacrifice on the part of the local property taxpayer than it should. So, what is the answer? How are we going to pay for these more and better public schools?

There is no question but that the states, with their broad tax base, should assume the bulk of the increased school costs that lie ahead. The big problem, of course, is going to be to get state legislatures to recognize and accept this as their responsibility. Being dependent as they are on so many different groups, and with so many lobbyists and pressure groups working on them all the time, it will take real dedicated leadership in both houses of the legislature to put through the necessary bill. But it can and must be done.

Now, briefly, what can Arizona do to meet this crisis?

1. The state legislature should, by mandatory action, bring about immediate reorganization of our smaller school districts into larger, more efficient and effective (and at the same time, much more economical) districts. In 1952 the legislature paid some \$25,000 for the Griffenhagen report, which survey recommended the districting of our state by counties for financial

purposes. However, nothing was done concerning this recommendation.

2. The state legislature should immediately set up a state school fund, from which needy school districts could borrow money for capital improvements at a low rate of interest. Some sixteen states now have such a fund.

3. The state legislature should increase the ten cent levy fund to a realistic figure (most states have gone to at least twenty-five and fifty cents, and others even higher).

4. Since some twelve school districts in the state have now reached their statutory debt limit of ten per cent, the state legislature should increase this limit to fifteen per cent, as a number of states have been forced to do.

5. The state legislature should provide the greater portion of the money needed to provide "a basic foundation program" for each public school child in the State of Arizona. A leading school finance consultant — one who has set up the program in a number of states — advises that when the state will provide between fifty and sixty-five per cent (the optimum seeming to be about fifty-five per cent) of such a foundation program, then the individual property taxpayer's burden will be lessened and he will, in most cases, be able to carry his share of the load without undue hardship.

6. And finally, the state legislature should attempt to remove the office of Superintendent of Public Instruction from politics, and let him be hired by an appointed board similar to the Board of Regents hiring the university presidents. Some will question, what has this to do with financing the public schools? To which we will simply answer: An administrator who doesn't have to spend a large share of his time getting re-elected, can provide sound counseling and innumerable ways of saving the state and school districts money.

Such action at the state level will most certainly not only prevent the extension of the cancer of federal aid to education, but will also continue the progress of public education in the United States to ever greater and greater heights.

D. L. Secrist, M.D.

EDITOR'S NOTES FOURTH NATIONAL CANCER CONFERENCE — 1960

(IN TWO PARTS)

PART I

Precancerous Lesions — This is a questionable term and probably an improper term. We do not know which lesions are truly precancerous. Ackerman(12) has shown that practically none of the proved thyroid cancers arise from a previously existing adenoma. However, in spite of this, he encourages that all nodules be removed, for one does not know which nodule is the malignant one prior to getting it under the microscope.

In the past keratosis of the larynx has been considered a precancerous lesion, yet this quality of being a pre-malignant lesion shows a very low incidence of conversion to cancer. Consequently, are we correct here calling this a pre-malignant lesion?

The adenomatous polyp of the colon has always been considered to be a precancerous lesion; yet it is difficult to prove that this hypothesis is correct. The distribution of polyps does not coincide with the distribution of cancer in the colon.(12)

If the concept of a precursor lesion is correct, that is, a lesion which may go on to be a cancer, it is very likely that the whole area where this precursor lesion arises has had some exposure in the past to a carcinogen. This exposure is not limited to the site of the development of the precursor lesion or the malignant lesion which eventually develops, but includes the entire area.(10)

Pathogenesis of Tumors — Tumors show a discontinuous development. There are intermediate stages between the normal before the de-

velopment of an obvious cancer. Some of the lesions actually get into the precursor phase and then regress with only a small portion going on to a carcinoma. Of those lesions progressing to a carcinoma, some will advance to a more malignant or more anaplastic phase. One cannot predict what any one lesion will do.(10) For example, with neoplasia of the basal epithelium of the cervix uteri, this basal epithelium may convert directly into an invasive cancer. Or, however, it may reach the malignant phase by going through a carcinoma-in-situ and then to an invasive cancer. However, the carcinoma-in-situ itself can regress or persist; or the basal epithelium can convert to a dysplasia, which can regress or persist or convert into an invasive cancer.(10)

Fundamentally, three main steps of development are often distinguishable. With the application of a carcinogen, there is a relatively rapid establishment of a state of incipient neoplasia which involves the entire area of exposure to the carcinogen. At this time there is not necessarily any growth or multiplication of cells or any other specific clinical or histological abnormality. Yet the tissue has been permanently altered and has acquired new capacities for progression to overt neoplasia. Secondly, after a considerable delay and with or without further stimulation from the carcinogen, visible lesions will emerge either locally or multifocally within the region of incipient neoplasia. These alterations are often multiple and varied; many are imperfect neoplasms. Finally, as a third stage, malignant tumors emerge. Some tumors develop by progression in the lesions established in the preceding stage, but others may emerge where no precursor lesion had existed. And they may emerge for prolonged periods after other lesions have regressed.

The early lesions are subject to diverse fates; some regress, some persist indolently, some grow progressively as benign tumors, and usually a small minority progress to malignant tumors. These lesions are precancerous only in the sense of a certain statistical probability of progression to carcinoma, and there is, usually, perhaps always, an alternate possibility that carcinoma will emerge elsewhere within the region of incipient neoplasia. Carcinoma-in-situ must be interpreted as an imperfect carcinoma from which

invasive cancer may develop by a progression of changes that confer properties of invasiveness on the malignant lesion which were not manifest or evident in the earlier lesion.(10)

At present the literature carries cases of 120 instances of spontaneous regression of proved cancer, proved by biopsy with adequate medical work-up and pathological study and a later proved complete regression of the malignant tumor.

Genetic Concepts of the Development of Malignant Change — Specific genes have been identified on specific chromosomes that are related to specific types of carcinoma.

The propagation and transmission of cancer viruses is under the control of genes. This may come about as in transduction, in which both the gene and virus are changed, and then by lysogeny where this transmittable alteration is transmitted to each daughter cell. The gene has been altered, but the virus also has been so altered that it is not recoverable.

Genes further enter into the occurrence of cancer, in their influence upon the endocrine factors in the control of the production of the hormones and in their control of the response of the end organ to the hormone.(32)

Chemical Carcinogens — Such as the polycyclic hydrocarbons, aromatic amines, nitroamines, aminostilbenes, azo compounds and metals, must operate by biochemical routes which are initially very different, but they may lead to a similar end result.(29)

It is doubtful that in the laboratory we have ever produced a tumor in a specie that could not have occurred in that specie spontaneously.

The carcinogen may work effectively as a tumor stimulating agent with the proper background, i.e., with the proper pre-existing change, that pre-existing change modifying the response of that animal to the carcinogen. With the chemical carcinogen there is a critical dose level, a certain amount that is needed to be tumorigenic. A greater amount is no more effective as a carcinogen.

The response to a carcinogen may vary with the dose given in the same specie, may vary with the different species to which the dose is given, may vary with the age it is given to a specific specie, or it may precipitate different tumors in different species. And some species may be immune to the tumor. Or, altering the dose may change the type of the tumor produced in the same animal or in the same specie.

The single carcinogenic chemical (DMBA) may give rise to entirely different neoplastic responses depending upon the species of animal used, the age of that animal, the dose of the material, and the route of administration.(13)

Chemical carcinogens may work as co-carcinogens. Urethane, if applied to the skin, can promote but not complete a skin carcinoma. If taken orally, it cannot initiate leukemia, but it can complete the development of leukemia.

Immunology — Treatment by this means can be passive, active or non-specific.

Passive therapy — normal globulin has been used with disappointing results; only one in 13 patients improved. The serum of a patient who has had a spontaneous remission will alleviate the recipient patient with a tumor of the same type. This has been noted in a specific case of melanoma. This recipient patient has had a complete remission for over five years.(19) Murray has developed a common antigen from horse serum, and presumably some patients have been benefitted. Bjorklund serum has given some good results.

Active immunity could be obtained with the use of vaccine prepared from a common antigen. The lipoprotein present in the cancer of man is a common antigen, but little work has been done here. A specific antigen has been developed using a cellular suspension of cancer cells with the addition of Freund's adjuvant. The vaccine is made from the suspension of fresh tumor cells in an equal volume of Freund's adjuvant (85 thin mineral oil, 15 emulsifying agent Arlacel A and 0.25 killed tubercule bacilli). The vaccine is given intradermally in the anterior aspect of both thighs, .1-1 cc. into each site. Most of the patients have developed an ulceration at the site that the vaccine is given. One patient de-

veloped a tumor at the site of inoculation. One year after treatment, of 26 patients with the vaccine (all had advanced pelvic cancer), 11 or 42% were alive and five were symptom free. In 21 comparable patients treated with radiotherapy, two were alive at the end of one year and one symptom free. In 19 similar patients treated with chemotherapeutic agents, three were alive, none symptom free. Therefore, one is inclined to believe that there has been some beneficial influence in a minority of the patients with the use of this vaccine.

Non-specific immunity with the use of proparidine has given only disappointing results to date.

Animals can be immunized by inoculation with cancer cells.

The serum of a normal patient is more destructive to cancer cells than the serum of the patient with advanced cancer.

Patients with malignant disease have been found to elaborate a factor which has been isolated from their serum which will lyse their own cancer cells. Certainly some patients produce antibodies to their own cancer.

As stated above, there is a common antigen in the carcinoma of the human, a lipoprotein.(19)

In rats the transplantable ascitic tumor may be and is inactivated by serum containing an antibody. This serum may be used effectively both on a therapeutic and on a prophylactic basis in these animals.(42)

Radiation — It is well established that radiation may cause any form of cancer if absorbed under appropriate conditions by a susceptible host. The mechanism of this carcinogenesis by radiation is not known. In some instances the carcinogenic effect of radiation may depend upon the activation of a virus.

There is a reversibility in the development or evolution of certain growths stimulated by radiation, indicating that this is a step-wise pattern of neoplastic transformation, a thought that is not inconsistent with the multiple mutation or viral hypothesis of cancer, but does exclude any

simple all-or-none mechanism.(4)

The probability that cancer will result from any given dose of radiation varies enormously with the form of cancer in question, the constitution of the irradiated subject, the manner in which the irradiation is absorbed and many other environmental variables. In no instance has the probability of cancer been a simple linear function of the dose. In fact, many forms of cancer have been found to decrease in frequency with increasing dosage levels.

X-ray irradiation may act by causing: 1) a hormonal imbalance, 2) activate a virus, 3) cause somatic alteration, 4) may depress host immunity. It may act directly as a carcinogen or as a co-carcinogen.(4)

In therapy with irradiation, the combination treatment with x-ray and Actinomycin D has demonstrated favorable responses in patients with Wilms's tumor, Ewing's tumor, hemangio-endotheliosarcoma and rhabdomyosarcoma. The simultaneous treatment with radiotherapy and chemotherapy in low doses was more effective than higher doses of either component alone and brought about therapeutic effects of longer duration.(42)

A significant development in irradiation therapy is the technique of removing large quantities of bone marrow from a patient before irradiation, quick-freezing the marrow and giving it back to the patient as needed after the irradiation is completed.

Chemical protection against irradiation has been observed in animals. In man this is not true, and there is a need for drugs with lesser toxicity. AET protects mice against the toxic effects of irradiation and also of nitrogen mustard and does not suppress the anticancer effects of either of these modes of treatment while controlling some of their toxic effects.(42)

Viruses — As with the chemical agents, the heterogeneity of initial reaction probably applies equally for the oncogenic viruses. The question remains, to what degree do chemical and physical carcinogens operate by the activation of a latent virus, or do viral agents introduce changes in the genome which can be induced by

chemical or physical agents?

No virus has been isolated to date or which has been proved to cause malignant disease in a human. There may be a single genetic factor in a host which will determine the infectiousness of a virus. The virus itself is composed of a nucleic acid center with a protein overcoat.(43)

The quantity of virus introduced may determine if a tumor is stimulated, and if a tumor is stimulated, that quantity of introduced virus will also determine the rate of growth. The virus itself may not be recoverable after forming or stimulating the formation of the tumor, the genes of the host probably having changed the virus itself. An antiviral substance has been proved to be produced.(3)

In various laboratory animals there have been more than 12 viruses isolated which will elicit tumors. These viruses may be strain or specie specific. The viruses in these animals may be complete oncogens or may require a secondary factor to produce a tumor. Of the complete oncogens we have the fowl tumors and the polyoma virus. Of the incomplete oncogens, that is, the virus needs a second factor to act jointly; with the milk tumor virus, a hormone is needed; with the mouse lymphatic leukemia virus, there must be a thymus present in the animal; in the Shope fibroma, there must be an external application of a carcinogen.(3)

Stewart and Eddy have demonstrated the release of an oncogenic virus in culture fluids which will produce multiple types of primary tumors in mice, hamsters, rats and rabbits. This has been designated the polyoma virus. This virus cannot be demonstrated in extracts of tumors without the use of tissue culture. Possibly this inability to demonstrate it in the tumor is due to the low concentration of the virus in the tumor or the presence of antibodies to the polyoma virus in the host bearing that tumor.(37)

Extracts and concentrates prepared from human neoplastic tissue have been reported to produce tumors in mice. This may be an inoculation of a specific virus or possibly only the injection of non-specific material which activated a latent virus in the host. (37)

"... there is no evidence available that the virus alone can be considered as the sole cause of all malignancies." If we could assume that viruses are integral parts of certain cells and that these cells usually lead a normal life in spite of or because of the permanent presence of symbiotic viruses, then if such a virus-infected but otherwise normal cell is exposed to one or more factors which can act on a "virus-infected" but not on a "non-infected" cell, malignant change may be the result of this inter-action of an infectious and non-infectious factor.(3)

Hormones — Action of hormones in tumorigenesis — they can play an endogenous role with an hormone imbalance, or the hormones may play a secondary role. In the first case, the endocrine factors are the causative ones of tumor induction and growth as illustrated by the estrogen-induced mammatropic pituitary tumors. Secondly, the hormones may act as cofactors with an extrinsic carcinogen as illustrated by experimental imbalance, initially these are dependent tumors which grow only in the presence of the endogenous imbalance. There is probably a cytoplasmic change. In time these dependent tumors change and become autonomous tumors, and then the change is nuclear in nature. However, if the imbalance is corrected during the phase of the tumor when it is still in the dependent phase, there may be a regression. However, if the imbalance continues, in time there is a release of the dependent tumor cells from the requirement of endocrine imbalance, and the tumor shifts into an autonomous state. In contrast to the tumors listed above resulting from an endocrine imbalance, carcinogen induced tumors of rats are immediately autonomous.(2)

In therapy, hormones are used in the treatment of carcinoma of the prostate, initially with castration, to be followed by estrogen therapy. Cancer of the endometrium is found to respond in many cases to progestational hormones. And the corticosteroids are used in lymphomas, advanced breast cancer and in multiple myeloma with hypercalcemia.(17a) Androgens and estrogens are used in advanced cancer of the breast.

Spread of Tumor Cells — Malignant cells are found in the regional veins draining a tumor site in 80% of lung cancer cases, in 55-60% of cancers of the stomach and in less than 50% of the

patients with malignancy of the colon. A similar incidence of tumor cells has been found in 11 examinations of bone marrow and the regional blood vessels.

There is a correlation, but a poor one, between the number of cells found in the circulating blood and the survivorship of the host.

There are a greater number of implants or takes of cells escaping into the peritoneum than of the malignant cells escaping into the blood or lymphatics.(11)

Recovery of tumor cells from washings of the peritoneal cavity range from 30% in cancer of the colon to over 80% in cancer of the ovary.

Tumor cells can rather frequently be recovered from the thoracic duct in patients with cancer of the lung, but rarely in patients with advanced cancer of the colon.(11)

While all types of cells may be discharged from the primary tumor into the blood or lymph, only the heteroploid cells may be able to establish metastatic foci.(42)

There are so many cells in the circulating blood of the patient with cancer prior to surgical manipulation that one is forced to question the significance of manipulation in the spread of cancer.(13)

The growth of metastatic cells in the various organs is not similar. Tumor cells can be recovered from the liver, brain and muscle for several hours after cell injection. None remains after 12 hours, and metastatic growth is extremely rare. However, if the animal receives cortisone prior to the injection of malignant cells, tumor cells can be recovered from the liver in nearly 100% of the animals, and cells may be found in the circulating systems 72 hours after injection. Cortisone seems to decrease the resistance of the host to the implantation of the circulating malignant cells.(11)

Some of the patients show a rapid development of distal metastasis for the first time shortly after surgical or irradiation treatment to their primary tumor.(42)

Cancer of the Skin — Epithelial cells of the epidermis, hair follicles, and cutaneous glands, all of which are derived from the secondary ectoderm, remain pluripotent and to a great extent equipotential throughout life. The basal matrix cells ordinarily mature to form prickle cells and keratinize. But prickle cells may reconvert to basal cells during wound healing. Hair follicles and sweat glands can form new epidermis. Epidermis can probably form new adnexa. However, pigment-forming cells are derived from neuroectoderm, and therefore melanocytes and melanocytic tumors are basically different from epidermal cells and their tumors. Further, the role of the mesoderm as a controlling factor in normal and abnormal growth is just being recognized.

Skin cancer does not present a sharp boundary between the benign and malignant neoplasia. One must divide the ectodermal tumors into those resembling epidermis and those resembling adnexa. This classification does not imply origin from separate sources and does not contradict the pluripotentiality of normal epithelia. This classification of epidermoid and adnexoid tumors implies that tumor cells have lost some of the potentialities of normal cells and have become fixed in one course.(28)

Epidermoid tumors may be classified into the benign tumors of which we have papillomas and under that warts and keratosis; malignant tumors as squamous cell carcinoma; and a third group that does not fit the definition of malignancy. The keratoacanthoma are "self-healing" squamous cell carcinomas.

The benign adnexal tumors consist of the adenomas and trichoepithelioma. The malignant tumors are adenocarcinomas. And a specific group which is made up of the basal cell carcinomas. There is mutual interdependence of ectodermal and mesodermal components.(28)

Malignant acanthosis nigricans is a benign dermatosis, yet a clue to internal carcinoma. There is an association with carcinoma in almost 100% of the cases. The two lesions run a parallel course; as the carcinoma progresses and regresses, the skin lesion progresses and regresses. The associated internal tumor is always an adenocarcinoma. It may originate in stomach, pancreas, cystic or hepatic ducts, colon, rectum,

esophagus, uterus, ovaries, prostate, breast or lung. The dermatosis may precede the internal malignancy by 10-16 years. (35)

REFERENCE

1. Michael B. Shimkin, National Cancer Institute, Bethesda, Md.
2. Kelly H. Clifton, Radiation Research Laboratory, Department of Radiology, University of Wisconsin Medical School, Madison, Wis.
3. Hilary Koprowski, Director, Wistar Institute and Wistar Professor of Research Medicine, University of Pennsylvania, Philadelphia, Pa.
4. Arthur C. Opton, Biology Division, Oak Ridge National Laboratory, Oak Ridge, Tenn.
5. Donald B. Shabon, Cancer Detection Center, University of Minnesota, Minneapolis, Minn.
6. Jerome A. Urban, Assistant Attending Surgeon, Memorial Hospital for Cancer & Allied Diseases, New York, N. Y.
7. Vincent P. Collins, Professor of Radiology, Baylor University College of Medicine, Houston, Tex.
8. Robert A. Huseby, Research Director, American Medical Center at Denver, Denver, Colo.
9. Ian Macdonald, Clinical Professor of Surgery, School of Medicine, University of Southern California, Los Angeles, Calif.
10. Leslie Foulds, Chester Beatty Research Institute, Institute of Cancer Research, Royal Cancer Hospital, London, England.
11. George E. Moore, Director, Roswell Park Memorial Institute, Buffalo, N. Y.
12. Lauren V. Ackerman, Professor of Surgical Pathology and Pathology, Washington University, School of Medicine, St. Louis, Mo.
13. Philippe Shubik, Professor of Oncology, Chicago Medical School, Chicago, Ill.
14. Mila Pierce, Professor of Pediatrics, The University of Chicago, Chicago, Ill.
15. William P. Longmire, Jr., Chairman, Department of Surgery, University of California, Los Angeles, Calif.
16. J. Englebert Dunphy, Professor of Surgery, University of Oregon Medical School, Portland, Ore.
17. Owen H. Wangenstein, Chief, Department of Surgery, University of Minnesota Medical School, Minneapolis, Minn.
- 16a. Ralph Jones, Jr., Chairman, Department of Medicine, University of Miami School of Medicine, Miami, Fla.
- 17a. Sidney J. Cutler, End Results Evaluation Section, National Cancer Institute, Bethesda, Md.
18. Albert Seagloff, Alton Ochsner Medical Foundation, New Orleans, La.
19. John B. Graham, Roswell Park Memorial Institute, Buffalo, N. Y.
20. Milton T. Edgerton, Associate Professor of Surgery and Plastic Surgeon-in-Chief, Johns Hopkins School of Medicine, Baltimore, Md.
21. J. W. J. Carpenter, Professor of Radiology, University of Chicago, Chicago, Ill.
22. R. Lee Clark, Jr., Director and Surgeon-in-Chief, M. D. Anderson Hospital and Tumor Institute, Houston, Texas.
23. Joel W. Baker, Chairman, The Mason Clinic, Chief of Surgery, Virginia Mason Hospital, Seattle, Wash.
24. Alfred M. Popma, Chief, Department of Radiology, St. Luke's Hospital, Boise, Idaho.
25. Arthur J. Vorwald, Professor and Chairman, Department of Occupational Health, College of Medicine, Wayne State University, Detroit, Mich.
26. John L. McKelvey, Professor and Head, Department of Obstetrics and Gynecology, University of Minnesota, Minneapolis, Minn.
27. Herman Brendler, New York University Medical Center, New York, N. Y.
28. Hermann Pinkus, Professor and Chairman, Department of Dermatology and Syphilology, Wayne State University College of Medicine, Detroit, Mich.
29. Alexander Haddow, Chester Beatty Research Institute, Institute of Cancer Research, London, England.
30. Willard E. Goodwin, Professor of Surgery and Neurology, University of California Medical Center, Los Angeles, Calif.
31. Katharine R. Boucot, Professor of Preventive Medicine and Clinical Professor of Medicine, Woman's Medical College of Pennsylvania, Philadelphia, Pa.
32. W. E. Heston, National Cancer Institute, Bethesda, Md.
33. H. Mason Morfit, University of Colorado School of Medicine, Denver, Colo.
34. Ralph Wayne Rundles, Professor of Medicine, Duke University School of Medicine, Durham, N. D.
35. Helen O. Curth, Assistant Clinical Professor, Dermatology, Columbia University, New York, N. Y.
36. M. Vera Peters, Senior Radiotherapist, The Ontario Cancer Institute (Princess Margaret Hospital), Toronto, Ontario, Canada.
37. Sarah E. Stewart, Medical Director, U. S. Public Health Service, Biology Laboratory, National Cancer Institute, Bethesda, Md.
38. Edward F. Lewison, Johns Hopkins University School of Medicine, John Hopkins Hospital, Baltimore, Md.
39. Oscar Auerbach, Senior Medical Investigator, Veterans Administration Hospital, East Orange, N. J.
40. N. N. Blokhin, President, USSR Academy of Medical Sciences, Moscow, USSR.
41. Richard H. Overholt, Surgeon, Overholt Thoracic Clinic, Boston, Mass.
42. National Cancer Institute, Bethesda, Md.
43. Wendell M. Stanley, Virology, University of California, Berkeley, Calif.
44. James T. Grace, Jr., Roswell Park Memorial Institute, Buffalo, N. Y.

MEDICAL SCHOOL LEADERSHIP

The intent of our teaching centers must be questioned as they prohibitively expand their house staffs to a point that they have inadequate clinical material for these men; and by so including many on their house staffs, there is an unreasonable drain upon the available interns and residents for other qualified hospitals.

With the expansion of medical care insurance, these large house staffs in many cases are afforded limited clinical experience. This has been proved to be so small in a number of cases that residents from excellent teaching institu-

tions are taking added work in secondary hospitals after they have completed their period of training for board qualification. The training for the boards in the various specialties is now so prolonged that this is an unjust demand upon these men to take further time to have the opportunity to do surgery and to be directly responsible for patients.

Many of our teaching institutions should so cut back their table of organization for their house staff that the men can be properly trained upon completing their residency program.

Further, one is forced to question the leadership shown and the training given to our medical students in medical economics, the changing social structure of America, and the public relations of medical practice.

Whether we desire it or not, the last 30 years have given us many socio-economic changes that will not permit the return to the economic structure of our fathers. In many aspects, that return is not desired. Our schools are not taking adequate steps to better adapt the students for this changing socio-economic outlook.

DWN

COUNTY, STATE AND AMERICAN MEDICAL ASSOCIATION

Is there adequate self-criticism within medical organizations? And are adequate steps being taken to correct inequities and injustices?

With the increase in health insurance, plus the shortage of hospital beds, it seems imperative within the near future that utilization committees be established at the various hospitals to eliminate those cases that will prove or do prove unjust claims against the insurance companies. These claims could become so great as to endanger the voluntary health insurance pro-

grams now in use.

Secondly, we give lip service to the effectiveness of the grievance committees at the various levels of the medical organization. However, their means of function is so cumbersome that at times these committees are ignored, and the criticism persists without receiving a satisfactory hearing. It is desirable that there be greater ease for filing complaints.

What active steps are we taking to eliminate that small percentage that we consider unscrupulous, the overchargers, the inadequately trained or those who have developed incompetence for any of many reasons?

We are inclined not to throw the first stone, for all of us are well aware there are incidents where we could have handled the patient more properly and adequately. This does not seem to justify our ignoring those whom we consider to fit the above classifications. It is this limited group that is the cause for the bulk of criticism against the medical profession and which, if allowed to continue, will enforce some controls upon our society.

DWN

EDITOR'S NOTE:

The editor can only apologize for his failure and the failure of the proofreader to pick up the error that appears on Page 666 of the November 1960 issue of *Arizona Medicine*.

Obviously, the statement, "We must defend the great body of medicine against private medical practitioners," was an error by the typesetter of inserting a segment of one sentence in conjunction with that of a succeeding sentence and developing the above statement, which does not appear in the original manuscript. We apologize.

Topics of Current Medical Interest

The Role of Professional Management

By

Edward W. Rice

Professional Management Consultant
Boise, Idaho

The following news release will create as much national interest as many of the events now making headlines in our daily papers.

Datelined Chicago, it bears the following heading:

**MEDICAL CARE CHARGES TO PATIENTS
BY PHYSICIANS DOWN 4%
FUTURE COST REDUCTIONS POSSIBLE
INCREASED SERVICES RENDERED BY
DOCTORS AT LESS COST**

The American Medical Association announced today in Chicago that there has been a very substantial reduction in the fees which are charged by America's medical doctors. The reduction of 4% has been brought about in the face of rising costs in practically all other segments of the economy and despite rising costs in the prices

which physicians pay for the goods and services which make up their overhead.

The announcement was made by Dr. Louis M. Orr, Chairman of the Association's Commission on Medical Care Costs and a past president of the Association. Dr. Orr stated that these reductions to the patient were made possible entirely within the medical profession through a program of studying and reducing business overhead costs in physicians' offices.

Joining with the AMA Commission on Medical Care Costs, to bring about this significant reduction were the Society of Professional Business Consultants and the Professional Management Section of the Medical-Dental-Hospital Bureaus of America whose memberships include the majority of the nation's leading professional business consultants.

During the same period of time which saw these cost reductions, the amount of medical

*Address given before the Arizona Chapter, American Academy of General Practice, October 13, 1960, Valley Ho Hotel, Scottsdale, Arizona.

care rendered to patients by Doctors increased by 10% as a result of better management methods. Both figures are exclusive of the medical care rendered without charge by America's physicians to the poor and indigent, which services have now increased to nearly 12% of the total medical care furnished by the nation's M.D.s.

In describing the mission of the Commission on Medical Care Costs, Dr. Orr stated:

"... when it comes to providing medical care and services we seek the best quality at the lowest possible costs. Any barrier which stands in the way of this objective should be removed ... immediately."

NO ... this press release has not yet been issued, but the significant thing is that it *could* be issued. The figures and amounts given are not wishful thinking. They are sound and actual figures of what is being done every day in well managed physicians' offices throughout our country.

Furthermore ... the day this news release *can* be issued will be the day that American medicine will strike a telling blow against the forces of "liberalism" who seek to socialize the medical system which has given our people the finest standard of health care the world has ever known.

Using a rudimentary example let's see how this situation can come about.

Assume a flat reduction of 10% in overhead costs, all of which is passed on to the patient. In addition we will allow for an increase of 10% in the volume of practice which is a normal result of improved business operations.

On \$100,000 of practice with an overhead of 40% and net of \$60,000 a reduction of overhead of 10% or \$4000 is passed on to the patient which reduces his overall charges the 4% stated in the news release.

Gross practice is then \$96,000 and overhead is now \$36,000, leaving a net of \$60,000 exactly the same as before.

The reduction of overhead by \$4,000 and total

practice volume by the same amount gives a new overhead rate of 37½%. (\$36,000 divided by \$96,000).

An increased practice of 10% or \$9,600 on \$96,000 gives a new total practice of \$105,600 to which the 37½% overhead is applied, giving overhead of \$39,600 which leaves a resulting net to the office of \$66,000, an increased net of 10%. Thus, patients get 10% more care by volume as distinguished from price, the doctor gets an actual 10% increase in net earnings and the cost of medical care and services rendered by the doctor to the patient is reduced an *actual* 4%.

While the figures used in the example are arbitrary, the percentages are conservative and will stand up because they are based upon actual accomplishment in offices over the nation by the nation's leading professional management consultants.

The figures of 10% for overhead reduction and that of 40% as overhead are conservative. Unfortunately a higher figure exists in far too many offices today.

If medicine is to succeed in its campaign to provide the highest quality and the greatest quantity of health care at the lowest cost, the matter of looking into and doing something about operating costs is mandatory. While it is of course, sound to point up and thoroughly publicize every added cost to the public from causes outside the profession; clearly as to matters within its own sphere, medicine must be like the queen ... above and beyond any possible reproach.

The question is — how does this come about??

American business has been accomplishing this very thing for years ... and in fact it is as a result of successful accomplishment by business that the growth and economic status of our country has come about.

The automobile, for example, is with us today as an integral part of our way of life because Henry Ford first put into practical operation the principle that by application of sound management, the product could be made better, sold at a reduced price and still bring a better

profit return to the manufacturer. As a concurrent and necessary part of such development it was necessary to bring together the functions of management, accounting and of financing — providing means of paying for the product.

It is readily recognized and admitted that the manufacture and sale of automobiles and the providing of so personal a thing as medical care are not to be compared as to nature of the product or service and this is in no way advocating "assembly line" medicine. However it does recognize and point up the fact that there is an economic and business factor in the practice of medicine that can not be disregarded from either the doctor's or the patient's point of view, unless of course, pure socialization of medical practice is adopted.

Management consulting began in this country at the turn of the century when business, as a result of the work of pioneers in the field of scientific management, recognized and accepted the basic distinction that *management is a separate activity*, completely detached from the mere *prerogative of ownership*.

As a result of this "break through" the field of independent management consulting has developed apace with the growth of business because of the absolute necessity for independent and objective appraisals as well as specialized knowledge and broad viewpoints, uninhibited by too close an association with operating problems.

Professional business management consulting has of course developed much later on the American scene since it is only recently that the economic side of medical practice has become important to the public generally and to the doctor particularly.

PROFESSIONAL BUSINESS MANAGEMENT has been defined as: "Analysis of a doctor's professional and personal business activities; the recognition of criticisms and their functioning; and the planning of remedial proposals with the direction and control of the determined actions."

The actual work of a professional management consultant, begins, or *should* begin with a

survey of the office concerned . . . a complete physical examination including laboratory and X-ray studies so to speak. After all, the business consultant, if he is going to be the "family physician," should know all he can about the patient.

Even if the consultant is desired only for a specified purpose, such as a personnel or a work load study, or perhaps to examine the plans of a proposed new office layout, a study of the accounts receivable structure — or working out a program for a partnership, he can no more do a satisfactory job in diagnosis and prescribing than the physician who is asked to prescribe "something for my belly-ache, Doc," without an examination.

If the problem includes the personal business affairs of the doctor, then the survey or study will not be confined to the office alone, but will naturally have to include a detailed study of such things as life insurance, investments, real estate holdings, tax picture, obligations and the family and its future needs and requirements — estate planning, the making of a will and even possibly the extravagance of the doctor's family.

Certainly, in the office study and sometimes in the personal study of the doctor's life and family the consultant will examine and probe into personal factors of the people involved. This is the part I choose to call "psychosomatic management" although tomorrow's speaker on "Psychosomatic Medicine in General Practice" might not find it altogether consistent with the problems he will present.

When the management consultant has made the survey, then and only then is he in a position to get to the specifics — to diagnose the case, so to speak and to prescribe treatment.

In the course of study and diagnosis he must recognize which matters fall in the category of the "specialist" — for example the tax field or legal problems which must be referred to the doctor's attorney, the insurance specialist, investment specialist and the like just as you general practitioners do. In the case of life estate planning for example, the problems which arise must absolutely be referred to the lawyer and the accountant if the plan is to be successful.

The professional management consultant has all he can do for himself and for his client just staying in the field of management, and that field it must be remembered is his prime function. Business which gave management consulting its start does not expect or intend that the manager shall be a specialist in every field but insists that he be a specialist only in management and have the good sense to recognize and defer specialist problems to the specialist. It seeks and wants the overall management picture.

Distinction must be made between professional management consulting and professional business services. The former is solely a management function and the latter are distinctly products of management.

Bear in mind that the Professional management consultant may be and usually is a specialist in one or more of the specialty fields, such as a lawyer, an accountant, a tax expert, insurance or finance for example. Further he may as part of his services, offer and engage in one or more of the fields of professional business services. He does this because the need for those services being done on a strictly professional plane is not being met elsewhere and thus must be made available for his own clients to have these services.

In addition, he makes full use of his specialized talents by doing these collaterally and of most importance he is permitted to participate in the actual operations to the extent that he maintains close understanding of the pulse of operations and thus broadens his own knowledge and ability in the problems affecting the business side of medical practice. It would be a substantial contribution too the business side of medicine if all professional business services were carried on by or under the supervision of trained professional management consultants and conversely if all consultants were a part of the performance of the specialized professional business services. As standards of performance are being developed and required in these fields the time will undoubtedly come when such will be true.

It is important that recognition be given to the fact that in the role of professional manage-

ment consultant, the consultant is in a position of professional trust to his client in that the activity he performs is of high individual responsibility and deals with problems strictly on an intellectual plane. Motivation is that of service and social duty and ethical responsibility in terms of medical ethics as well as personal ethics.

Of the greatest significance is the requirement that in the role of professional management, the consultant must remain independent in his judgment and thinking, and never be in a subordinate position.

Just as no ethical physician subordinates his professional judgment to that of the patient or anyone else, so must the management consultant be in the same position at all times. If clients do not like his honest advice he may regret it sincerely; but no one would condone his altering his honest opinion to avoid giving offense or collecting a fee.

With your indulgence I would like to read with pardonable pride a personal note I received from a management client just before leaving for this meeting which I think will illustrate this point.

"Dear Ed:

"Frequently I have found I fail to adequately express my appreciation to persons who contribute a great deal to my life. I want you to know that I am very grateful to you for the many extra hours you have spent on our problem, and assure you that any verbal friction was in no way intended to contest your advice. You have been very patient, very helpful, a sounding board, a friendly listener to a frequently emotional man. I respect you, need you, and sincerely appreciate all the many things you have done to help me."

S/_____

Finally, it is necessary to consider one of the images of the doctor which is held by the American public and that is the image that is almost universal — that the doctor is a poor business man. Because of this image, *everybody, but everybody* is ready and willing, and I might say feels fully qualified to advise the doctor on his business problems.

Not only does this include everybody who wants to sell the doctor something, from life insurance to all the new office machines and gadgets, on to burnt matches and gold mines; but anyone else whose income is not dependent upon and whose reputation does not stand or fall solely upon the service he renders to the doctor and NOT the profit or commission he makes on a sale to the doctor.

The test is strictly one of measuring payment of the fee. Unless the adviser is solely dependent upon the results he furnishes to the doctor in the services of management, then the obvious conflict of interest furnishes the answer.

CONCLUSION

In closing I would offer this word of caution. Don't rush home and fire the office girl to replace her with someone more "efficient" or "cheaper." And don't go home all fired up to bring about "efficiency" in the office — or don't try to arbitrarily slash all expenditures 10% just to solve your problem — assuming that you feel that you have one.

Many times cutting costs is the wrong approach entirely. I know of cases where the problem is strictly one of the doctor being a pinch-penny who counts the pennies and never misses the dollars.

By the same token don't get all fired up to buy a new bookkeeping machine, dictating machine or some other fancy gadget, or remodel the office. You could waste an awful lot of money without any good result. It's possible that a good management consultant might recommend that you don't need any of these things.

Basically there must be an overall study and an overall plan taking into consideration your own goals, capabilities and prospects of achieving them. Very sincerely and very frankly I have seen many professional management problems where the entire problem was the doctor himself. I assure you, that's usually the toughest one.

Finally — maybe you are now convinced that you have no problems and everything is working perfectly. I sincerely hope that such is the situation. However, I would remind you of the recent history making passenger airliner trip.

After the airplane was airborne the loudspeaker announced that this was an historic flight in that it was the first passenger airliner flight with no crew at the controls. The loudspeaker assured the passengers that they need have no cause for alarm as their flight was being monitored from the ground by radio and radar. The last known words to come over the speaker were: "everything is working perfectly . . . working perfectly, working perfectly . . ."

THREE PHOENICIANS AWARDED UA MEDALLION OF MERIT

Three residents of Phoenix, including an archaeologist, a psychiatrist, and a surgeon, were awarded The University of Arizona's 75th Anniversary Medallion of Merit at a College of Liberal Arts luncheon in the UA Student Union Wednesday, Oct. 12.

The Medallion recipients are Odd S. Halseth, former city archaeologist of Phoenix; Dr. Samuel Wick, superintendent of Arizona State Hospital; and Dr. Dermont W. Melick, past president of the Maricopa County Medical Society and the Arizona Medical Association, and member of the Western Interstate Commission for Higher Education (WICHE). The medallions were presented by Dr. Richard A. Harvill, UA president.

In a citation presenting Halseth, Dr. Emil W. Haury, head of the UA anthropology department and director of the Arizona State Museum, said that as city archaeologist of Phoenix, "Halseth has dedicated his life to the preservation of the remains of ancient cultures in the Salt River Valley, and to the successful interpretation of these remains to a large and perceptive citizenry."

Educated in Norway and Germany, Halseth was formerly curator of art at the San Diego Museum of Man and curator of archaeology at

the Museum of New Mexico. He served as city archaeologist in Phoenix from 1929 to 1960.

The citation introducing Dr. Wick was read by Dr. Neil R. Bartlett, head of the department of philosophy and psychology, who said, "Since 1952 Dr. Wick has devoted his skills in psychiatry to the improvement of the Arizona State Hospital in Phoenix. He has upgraded patient care at that hospital, and with his vision he has pointed the road to the future in formulating plans for day-care centers and out-patient clinics. He has created a better understanding by the people of this state of the life problems faced by so many of its citizens. In this educational effort can be counted his wholehearted cooperation in helping to solve some University problems in research and in training professional specialists."



L. to r.: President Richard A. Harvill gave The University of Arizona's 75th Anniversary Medalion of Merit to Dr. Dermont W. Melick, Phoenix physician and past president of the Maricopa County Medical Society and the Arizona Medical Association and member of the Western Interstate Commission for Higher Education; Dr. Samuel Wick, superintendent of Arizona State Hospital; and Odd S. Halseth, former city archaeologist of Phoenix. The presentation to the Phoenix recipients took place at a luncheon in the UA Student Union on Oct. 12.

Dr. Melick was presented by Dr. Herbert D. Rhodes, dean of the Graduate College and executive secretary of WICHE. A 1931 graduate of The University of Arizona, Dr. Melick received the doctor of medicine, master of science,

and doctor of science degrees at the University of Pennsylvania. He has been engaged in the practice of medicine and surgery in Phoenix since 1946. He is a member of the American College of Surgeons, the American Association for Thoracic Surgery, the American College of Chest Physicians, the Southwestern Surgical Congress, and the Western Surgical Association.

A past president of both the Maricopa County Medical Society and the Arizona Medical Association, Dr. Melick has been exceptionally active in medical education. He was one of Arizona's first commissioners of the Western Interstate Commission for Higher Education and still serves on that body, which aids Arizona residents in securing an education in medicine, dentistry, and veterinary medicine.

FELLOWS OF THE AMERICAN COLLEGE OF SURGEONS

Approximately 1,175 surgeons were inducted October 14 as new Fellows of the American College of Surgeons in ceremonies closing the annual five-day Clinical Congress in San Francisco.

Those receiving this distinction from the State of Arizona at the 1960 Convocation are:

Glendale

George E. Reynolds, Lt. Col., USAF

Mesa

George L. Hoffman

Sherman W. Thorpe

Phoenix

Morton S. Comess

Ray Fife

Howard W. Kimball

Robert E. Lorenzen

Hal W. Pittman

Monroe E. Shack

Adolph J. Urban

Tucson

Philip G. Dierickson

ARIZONA POISONING CONTROL INFORMATION CENTER

HAZARDS OF INTENTIONAL INHALATION OF PLASTIC CEMENT FUMES

The Arizona Poisoning Control Information Center at The University of Arizona College of Pharmacy recently received a number of disturbing reports regarding the intentional inhalation of plastic cement by teenagers in this state. For example, since July 1, 1960, the Phoenix Police Department recorded processing 11 juveniles who were under the influence of plastic cement vapor. The Police Department in Tucson has a record of 1 teenager who was involved in the inhalation of plastic cement fumes and who also admitted knowledge of several schoolmates who practiced this undesirable fad. A Tucson physician reported to this office that he was treating a young girl for the effects of plastic cement sniffing and indicated that he had information about almost a score of other youths who participated in this type of practice. Although it is impossible to determine the prevalence of this dangerous fad, the incidence of intentional inhalation of plastic cement vapor is, undoubtedly, great enough to be of grave concern to law enforcement officials and medical practitioners. In the area of law enforcement, for instance, a youth intoxicated by the fumes from plastic cement would be no less a menace behind the wheel of an automobile than if he were driving under the influence of alcohol.

The cases reported to the Arizona Poisoning Control Information Center have mainly involved the use of a plastic cement which contains toluene as the solvent. Toluene is an aromatic hydrocarbon compound and is chemically related to xylene and benzene. The inhalation of toluene (or its congeners) may result in a transient euphoria, in addition to other symptoms such as headache, giddiness, vertigo, ataxia, and tinnitus. It may also cause mild macrocytic anemia. Although the lethal dose of inhaled toluene is unknown, the mean lethal dose of benzene is

estimated to be about 15 ml (approximately ½ fluid ounce) by mouth. Confusion, stupefaction, and coma (accompanied by tremors, motor restlessness, hypertonus, jactitations and generally hyperactive reflexes) are the more severe symptoms of intoxication induced by aromatic hydrocarbon compounds. Since these solvents are potentially capable of sensitizing the heart to epinephrine, death may occur as the result of sudden ventricular fibrillation as well as from respiratory failure(1).

Although other organic solvents employed in various types of plastic cement may possess no greater acute toxicity than toluene, they may, nevertheless, be disabling. Many of these solvents, such as ethylene dichloride and methyl cellosolve, are capable of causing fatal liver and/or kidney damage.

In view of the potentially serious consequences of intentional inhalation of plastic cement fumes, the Arizona Poisoning Control Information Center urges that parents, physicians, law enforcement officials, educators, etc., inform all youths of the hazards of plastic cement vapors and discourage the abuse of plastic cement.

STATISTICS OF 82 POISONING CASES IN ARIZONA DURING SEPTEMBER 1960

AGE:

72.1% involved under 5 year age group	(59)
4.8% involved 6 to 15 year age group	(4)
6.0% involved 16 to 30 year age group	(5)
11.0% involved 31 to 45 year age group	(9)
3.7% involved over 45 year age group	(3)
2.4% were not reported	(2)

NATURE OF INCIDENT:

78.1% accidental	(64)
19.5% intentional	(16)
2.4% were not reported	(2)

TIME OF DAY:

31.7% occurred between 6 a.m. and noon	(26)
31.7% occurred between noon and 6 p.m.	(26)
13.4% occurred between 6 p.m. and midnight	(11)
1.2% occurred between midnight and 6 a.m.	(1)
22.0% were not reported	(18)

OUTCOME:

80.5 recovery	(66)
0.0 fatal	(0.0)
19.5% were not reported	(16)

CAUSATIVE AGENTS:

Internal Medicines	Number	Percent
Aspirin	16	18.6
Other Analgesics	0	0.0
Barbiturates	8	9.2
Antihistamines	3	3.5
Laxatives	1	1.2
Cough Medicine	0	0.0
Tranquilizers	4	4.7
Others	13	15.0
Subtotal	45	52.2
External Medicines		
Liniment	0	0.0
Antiseptics	0	0.0
Others	3	3.5
Subtotal	3	3.5
Household Preparations		
Soaps, Detergents, etc.	1	1.2
Disinfectants	1	1.2
Bleach	2	2.3
Lye, corrosives, drain cleaners	0	0.0
Furniture and floor polish	2	2.3
Subtotal	6	7.0
Petroleum Distillates		
Kerosene	2	2.3
Gasoline	2	2.3
Others	5	5.8
Subtotal	9	10.4
Cosmetics	1	1.2
Pesticides		
Insecticides	4	4.7
Rodenticides	0	0.0
Others	3	3.5
Subtotal	7	8.2
Paints, Varnishes, Solvents, etc.	4	4.7
Plants	5	5.8
Miscellaneous	4	4.7
Unspecified	2	2.3
TOTAL	86*	100.0

*The total number of causative agents exceeds the actual number of poisoning cases since in certain individual poisoning incidents more than one agent was involved.

1. Gleason, M. N., Gosselin, R. E., and Hodge, H. C., "Clinical Toxicology of Commercial Products," The Williams and Wilkins Co., Baltimore, 1957, pgs. 98, 182.

Willis R. Brewer, Ph. D.
Dean, College of Pharmacy
The University of Arizona, Tucson
Albert L. Picchioni, Ph.D.
Pharmacologist and Director
Arizona Poisoning Control Program
The University of Arizona, Tucson
Lincoln Chin, Ph.D.
Pharmacologist
The University of Arizona, Tucson

MEDICAL COURT CASES

by Howard Newcomb Morse
Counsellor at Law of the
Supreme Court of the
United States of America

Peddicord vs. Lieser
Supreme Court of Washington
105 P. 2d 5

William C. Peddicord, 19 years of age, was living in a house located on the United States Army reservation at Vancouver, Washington, where his father was a civilian employee. At about 11 a.m., Peddicord, who was then alone in the house, was endeavoring to repair a defective electric refrigerator, in which the chemical used as a refrigerant was sulphur dioxide. He had only a slight knowledge of how the refrigerator operated, and no knowledge of the kind of refrigerant contained therein.

In the course of his efforts to make the repair, he shook the refrigerator, and then, by means of a screwdriver, "removed the plate on the front of the machine where the ice cubes were and began to shake it some more." An explosion followed, as the result of which, the refrigerant was ejected with great force against his body in the region of the stomach. Covering his eyes with his hands, he immediately ran outdoors. In the front yard, he met his younger step-brother, of whom he requested that a physician be summoned at once.

The family physician was called by telephone, but he, being unable to come, suggested the name of Dr. Herbert Lieser, who was a physician and surgeon engaged in general practice. Dr. Lieser, in response to a telephone call, went immediately to Peddicord's home, arriving there within five or 10 minutes, or about 15 minutes after the accident had occurred. In the meantime, the step-brother had, at Peddicord's request, procured a pan of water and a cloth, and with these the latter fashioned a wet compress,

and applied it over his eyes. On the arrival of the physician, the patient was on his hands and knees, holding the wet bandage in place.

The patient later testified as follows as to what occurred during the physician's visit: "He (the physician) inquired as to what had happened, and, the best I could, I explained that the refrigerator had blown up, and that I believed that it contained ammonia, and asked him what I should do. He informed me that I should stay outside in the fresh air and sunlight for a couple of hours and I would be all right, as good as I ever was; that I was getting my just desserts for monkeying around that refrigerator. . . . He left (the physician had gone into the house to examine the refrigerator) and then he soon returned and informed me that he didn't think it was ammonia in the refrigerator, that he thought it was some other type of gas which he didn't express the name of, didn't seem to know exactly what. I asked him then if he would look at my eyes, and he made the remark that, what did he want to look at them for? He had seen hundreds of cases just like it and knew what they looked like and that if I would just do as he told me, stay outside in the fresh air and sunlight for a couple of hours I would be all right, that it was just like a smoke burn, and with that I never heard him again."

The patient's testimony was corroborated by two witnesses, the step-brother and a neighbor who had appeared at the scene just shortly before the arrival of the physician. The step-brother, however, also testified that the physician's statement that "You are getting just what you deserve for fooling around" was in response to the information imparted to him by the patient and the witness, to the effect that the patient "was fooling with the refrigerator and it blew up." When asked whether the physician was joking or was serious in making the statement attributed to him, the witness said: "From those words, I believe that he was just kind of joking about it."

The physician testified that, upon his arrival at the place, and after inquiring as to the cause of the accident, he made partial examination of the patient's eyes, but was unable to make a thorough examination because to do so would

have required certain instruments which he did not have.

During the time the physician was present, a period of 10 or 15 minutes, the patient made no complaint of pain, and, according to his own subsequent testimony, did not, during that period, experience any noticeable pain or discomfort other than a headache and a cough. The physician did not irrigate the patient's eyes, nor administer any other remedy or palliative to him.

Shortly after the physician had departed, the patient, who was then alone, began to experience pain in his eyes, and difficulty in breathing. He thereupon went into the house unattended, and telephoned to the army hospital for an ambulance. Within 15 or 20 minutes, the ambulance arrived, and the patient was taken to the hospital, where he was given immediate care. During the next 24 hours, fluids of one kind or another were constantly injected into his eyes; no opiates, however, were administered. When the patient left the hospital, the next day, he was unable to see anything, and from that time on was totally blind.

The patient brought an action in the Superior Court of Clark County, Washington, against the physician to recover damages for injuries resulting from alleged malpractice. The court rendered judgment for the patient, and the physician appealed.

The Supreme Court of Washington reversed the decision of the court below and dismissed the case. The Supreme Court declared: "If, in this instance, the alleged failure to make an examination of respondent's eyes be considered as a failure to make any diagnosis at all, it still would not afford a right of action unless the treatment which followed was improper. An essential element of the right of action is improper treatment. . . . Viewing all the testimony in this case as a whole, the most that can be said on respondent's behalf is that there is a serious disagreement among qualified experts as to the advisability of putting water on eyes damaged by sulphurous acid. Under such circumstances, appellant cannot be held guilty of malpractice because he did not pursue that course of treatment."

SOUTHWEST HEALTH-O-RAMA

A full scale, professionally produced Southwest HEALTH-O-RAMA, encompassing the many facets of the health field, has been announced by Robert R. Rinehart, chairman of the coming event.

Scheduled for February 16-21 inclusive, 1961, at popular Tower Plaza, Phoenix, Arizona, and presented under the sponsorship of the Phoenix Community Council — a non-profit organization — with the endorsement of the Maricopa County Medical Society — the 35,000 square foot plus show is expected to draw thousands of visitors from many parts of Arizona. This state resident attendance will be further enlarged because of the many tourists and winter residents who will be in Phoenix and adjacent places during the show dates.

Exhibits in Health-O-Rama will be comprised of displays and demonstrations by member organizations of the Council, and by commercial firms whose products and/or services meet with the approval of the Health-O-Rama Executive Committee. All such participants and their presentations must be of the caliber necessary to maintain the high standard of ethics set by the sponsors and cooperating organizations. Exhibits must be attractively designed to assure visitor interest and to coincide with the over-all level of the producers.

Health educational programs, free medical tests of varied types, and demonstrations will be highlights of Health-O-Rama. Qualified speakers are being invited to appear on daily lecture programs. Motion pictures of an appropriate nature will also be shown. The nominal box office charge will include admission to these features.

The Health-O-Rama Executive Committee includes: Chairman, Robert R. Rinehart, Public Relations Director, Arizona Blue Cross & Blue Shield, Co-Chairman, William W. Wood, Ex-

ecutive Director, Arizona Heart Association; Committee Members — Mrs. Mary Anderson, Area Medical Consultant, U. S. Department H E W , George C. Bright, member Board of Directors, Community Council, Stanford F. Farnsworth, M.D., Director, Maricopa County Health Department, Richard O. Flynn, M.D., Maricopa County Medical Society, Milt Graham, President, Community Council, R. W. Russon, M.D., Maricopa County Medical Society, Elvin Sayre, Executive Director, American Cancer Society, Arizona Division, Miss Cherry Tsutsumida, Director of Health Education, Arizona State Health Department. Ex-Officio — W. Albert Brewer, M.D., President, Maricopa County Medical Society, Milton Gan, Executive Director, Community Council.

Further information relative to Health-O-Rama may be obtained by contacting Health-O-Rama, P. O. Box 10054, Phoenix, Arizona.

SCHOOL OF PRACTICAL NURSING

The S. H. Kress School of Practical Nursing, opened in September, 1957, at the Pima County Hospital, 2900 S. 6th Ave., Tucson, Ariz., prepares carefully selected, qualified applicants to give good nursing care to patients of all ages under the direction of a licensed physician or a registered professional nurse. Upon satisfactory completion of the course, the graduate is eligible for state licensing examination which qualifies her as a Licensed Practical Nurse.

The school is approved by the Arizona State Board of Nurse Registration, the National Association for Practical Nurse Education and Service, and the Bureau of Indian Affairs. The cost of the course is approximately \$170. Any woman interested in practical nursing who is between the ages of 18 and 50, a graduate of a high school or who completes a high school equivalency test, is a citizen of the United States and in good physical and mental health should contact the school for a brochure.

MEDICAL HISTORY OF WAR OFFERED

Many of the medical lessons learned during World War I had to be relearned under fire during World War II because of paucity of distribution of the World War I medical history.

Lieutenant General Leonard D. Heaton, The Army Surgeon General in an endeavor to prevent this costly relearning process, in the unhappy event of another war, has directed the preparation, publication, and distribution of the "History of the Medical Department, United States Army, in World War II." General Heaton is particularly anxious that information of the existence and availability of this history be circulated widely among the profession, both military and civilian.

Of the 48 volumes programmed for the series, 15 have been published and can be purchased at modest cost from The Superintendent of Documents, Government Printing Office, Washington 25, D. C. The set of 15 volumes may be purchased for \$66.50 or individual volumes can be obtained at remarkably low prices. Commanding officers of medical units may requisition copies for their medical unit's libraries by submitting DA Form 17 directly to The Historical Unit, U. S. Army Medical Service, Washington 12, D. C.

Volumes now available are:

- "General Surgery" — Edited by Michael E. DeBakey, M.D.
- "Neurosurgery," Volume (Head Injuries) — Edited by R. Glen Spurling, M.D. and Barnes Woodhall, M.D.
- "Neurosurgery," Volume II (Spinal Cord and Peripheral Nerve Injuries) — Edited by R. Glen Spurling, M.D. and Barnes Woodhall, M.D.
- "Ophthalmology and Otolaryngology" — Edited By M. Elliott Randolph, M.D. and Norton Canfield, M.D.
- "Orthopedic Surgery, European Theater of Operations" — Edited by Mather Cleveland, M.D.

"Orthopedic Surgery, Mediterranean Theater of Operations" — By Oscar P. Hampton, M.D.

"Physiologic Effects of Wounds" — Edited by Fred W. Rankin, M.D. and Michael E. DeBakey, M.D.

"Vascular Surgery" — Edited by Daniel C. Elkin, M.D. and Michael E. DeBakey, M.D.

"Cold Injury, Ground Type" — By Tom F. Whayne, M.D., and Michael E. DeBakey, M.D.

"Dental Service" — George F. Jeffcoat, D.M.D.

"Environmental Hygiene" — By James Stevens Simmons, M.D. and others.

"Personal Health Measures and Immunization" — By John E. Gordon, M.D., Tom F. Whayne, M.D. and others.

"Communicable Diseases," Volume IV — By John E. Gordon, M.D., Joseph Stokes, M.D. and others.

"Hospitalization and Evacuation, Zone of Interior" — By Clarence McKittrick Smith.

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Reprints

Retirement Program For Doctors' Employees

The first medical association in the country to establish a retirement program for all doctors' employees is the Riverside County Medical Association, whose physicians realized a definite need to provide adequate security for career employees in medicine.

According to RCMA executive secretary, Herbert O. Brayer, the purpose of the plan is to promote medicine as a lifetime career "not just for the M.D. and R.N., but for those all important receptionists, bookkeepers, lab-technicians, practical nurses, medical secretaries and others who now are essential to the successful practice of medicine."

The program is open to every full-time employee of the 257 physician members of the Riverside County Medical Association, or of the Association itself, who has completed 12 consecutive months of employment, working at least 20 hours per week. Payroll deductions for each participating employee amount to 3 per cent of gross earnings. The physician employer will match the contributions made by his employees,

contributing 3 per cent of their earnings.

From *The PR Doctor*, Oct. 1960
(Issued by Communications Division,
American Medical Association)

THE GOOD OLD DAYS

The following is an extract from the "Medical Record" of February 29, 1896. Although the overtones are tragic, some of the comments regarding the medical advice of the "Weeder's Digest" or "Dime Magazine" are daily occurrences in our time. And do we not concern ourselves constantly with the question of hospitals practicing medicine? Only the side of the Women's Auxiliary appears to have improved with time.

A.J.B.

"Starvation Among Paris Physicians — We learn from the Paris correspondent of the *British Medical Journal* that Dr. Langlard, after fifty years of honorable practice, found no other way of escaping starvation than suicide. It is esti-

mated that there are twenty-five hundred medical men battling with starvation, borne down by heavy rent and taxes. Year by year the number of medical men increases, while, owing to the progress of hygienic science and still more to the disastrous competition of the hospital outpatient rooms and private gratuitous clinics, the number of patients decreases. It is the doctors themselves, says M. Lataud, who have created their own misfortunes. They have taught lady patronesses of different societies to diagnose disease, to dress and bandage wounds, to vaccinate their own children and those of their neighbors. Medical science is vulgarized in every way. Doctors write in important daily papers explaining how bronchitis and cramps of the stomach are to be cured, and in fashion journals they teach how to cure pimples and avert headaches. Furthermore, they have urged that hospital treatment be paid at the rate of 4s. 2d. per day; the middle classes profit by this tariff to become hospital patients, their conscience at ease since they pay. Five hundred thousand gratuitous consultations are given yearly in Paris dispensaries, and in this way a large amount of fees is diverted from the medical profession. M. Lataud includes in his indictment the Association des Dames, more or less patriotic, which sends forth thousands of women who, because they have attended a few medical lectures and walked the hospitals for a few weeks, believe themselves to be something very like doctors and treat their families and friends. This school of medical half-knowledge has been created and kept going by medical men, who are now being crushed by the work of their own hands."

(From the "Medical Record," February 29, 1896)

LABEL WITH NAME OF DRUG

Editor,
American Journal of Ophthalmology:

The addition of the above five words to every

prescription will benefit both you and the patient. Mystery as to the nature of medications is an unwarranted and obsolete tradition. The following advantages accrue from labeled prescriptions:

1. If the patient is taking more than one medication, a change in instructions concerning one is less likely to result in confusion. (Which bottles do I stop using, Doc?)

2. When one of multiple prescription is exhausted, it can be identified for refilling. (Doc, the round bottle is empty.)

3. Several doctors caring for the same patient can more easily co-ordinate treatment. (Why are you giving me Diamox for my eyes when the heart doctor uses it for my edema?)

4. A consultant or new physician need not change or discard perfectly adequate, but unknown, medications. This is a very common unnecessary expense to patients.

5. In case of emergency, the nature of the patient's medications can more rapidly be determined.

6. Medications to which there is a known allergy are less likely to be given without the patient's recognition.

7. Re-use of remaining medication later in the course of the disease or by another member of the family becomes possible upon your advice.

8. Economy, in these days of high drug costs, is achieved for the various reasons already given.

9. Dispensing errors may more readily be detected. (And they happen!)

A great deal of confusion could be avoided if prescriptions were clearly identified. Certainly in matters as important as human health there is no room for uncertainty.

(Signed) William H. Havener,
Columbus, Ohio

(From the American Journal of Ophthalmology, Volume 49, Number 4, April 1960, reprinted by permission.)

Kalamazoo Medical and Surgical Fee List

Adopted July 18, 1907

Out-of-Office Attendance.

General Surgery.

General Medicine.

VISITS IN CITY—T. A. M. to P. M.....	\$ 1.50— 3.00
VISITS IN CITY—P. M. to T. A. M.....	2.00— 5.00
VISITS DURING OFFICE HOURS.....	2.00— 5.00
For each additional member of family during a visit.....	.50— 1.00
VISITS IN COUNTRY, Extra per mile.....	.50— 1.00
VISITS OUT OF TOWN, (absence not to exceed half a day).....	15.00— 50.00
VISITS IN CASES OF DANGEROUS CONTAGIOUS DISEASES.....	2.00— 10.00
VISITS IN CASES OF POISONING.....	2.00— 25.00

Office Attendance.

General Medicine.

OFFICE CONSULTATION.....	\$ 1.00— 5.00
PHYSICAL EXAMINATION.....	1.00—10.00
CHEMICAL or MICROSCOPICAL EXAMINATION (Urine, blood, sputum, stomach contents, etc.).....	1.00—15.00
OFFICE TREATMENT.....	1.00—10.00
TELEPHONE CONSULTATION.....	.50— 1.00

Surgery.

MINOR OPERATIONS (ARISTEA EXTRA)....	\$ 2.00—15.00
Administration of anesthetic.....	5.00—25.00
Operative assistant.....	1.00—5.00
OFFICE TREATMENT.....	1.00—10.00

General Diseases.

DOUBLE ORDINARY FEES.....	
Retainer required in advance.....	

Gynecology.

LOCAL EXAMINATION.....	\$ 2.00—10.00
LOCAL TREATMENT.....	2.00— 5.00

Out-of-Office Attendance.

Gynecology.

LOCAL EXAMINATION.....	\$ 3.00—15.00
LOCAL TREATMENT.....	2.00— 5.00

OPERATIONS.

Fertile cervix.....	5.00—20.00
Valvovaginal.....	5.00—25.00
Imperforate hymen.....	5.00—25.00
Stricture of vagina.....	25.00—100.00
Vaginal fistula.....	25.00—100.00
Cervicectomy.....	25.00—50.00
Perineorrhaphy.....	25.00—50.00
Tracheorrhaphy.....	20.00—75.00
Dilatation of cervical canal.....	5.00—10.00
Excision of cervix.....	10.00—25.00
Amputation of cervix.....	25.00—75.00
Ovariotomy.....	100.00—500.00
Ovarian tumors.....	100.00—500.00
Oophorectomy.....	100.00—500.00
Extra-uterine pregnancy.....	100.00—500.00
Hematectomy.....	100.00—500.00
Hysterectomy.....	100.00—500.00
Uterine tumors.....	100.00—500.00
Intra-uterine tumors.....	10.00—50.00

DISMEMBERMENTS.

Correction of version.....	2.00—10.00
Correction of flexion.....	2.00—10.00
Correction of prolapsus.....	2.00—10.00
Fitting pessary.....	2.00—10.00
Alexander's operation.....	50.00—100.00
Ventro-fixation or suspension.....	100.00—200.00

Obstetrics.

ORDINARY DELIVERY.....	15.00—25.00
ALL VISITS EXTRA.....	
DELIVERY BY FORCEPS, EXTRA.....	5.00—25.00
DELIVERY BY OPERATION.....	100.00—300.00
DELIVERY OF TWINS.....	25.00—50.00
DELIVERY OF PLACENTA ONLY.....	5.00—25.00
PREMATURE DELIVERY, (Assistance Extra)....	15.00—50.00
PRIMARY PERINEORRHAPHY, Extra.....	5.00—25.00
TREATMENT OF MISCARRIAGE.....	25.00—75.00

Medico-Legal Cases.

EXPERT TESTIMONY.....	\$ 25.00 upward
EXPERT INVESTIGATIONS.....	25.00 upward
(taken from premises over half a day, \$25.00 and expenses).....	
POST-MORTEM EXAMINATION.....	25.00—100.00

Consultations.

IN GENERAL MEDICINE CASES.....	5.00—25.00
IN SURGICAL CASES.....	5.00—25.00
IN GYNECOLOGICAL CASES.....	5.00—25.00
IN ORTHOPEDIC CASES.....	5.00—25.00
IN OUT-OF-TOWN CASES.....	15.00—100.00

LOCATIONS.

Main arteries.....	\$ 25.00—100.00
Branches.....	50.00— 75.00

RESECTIONS.

Varicose veins.....	5.00—100.00
Varicocele.....	25.00— 75.00
Diseased bone.....	100.00—200.00
Joints, digits.....	10.00— 25.00
Joints, limbs.....	50.00—200.00
Trepelling skull.....	100.00—500.00
Nerve trunks.....	50.00—200.00
Casertan ganglion.....	50.00—100.00
Intestine.....	100.00—500.00

AMPUTATION.

Digits.....	10.00— 25.00
Hand or foot.....	50.00—100.00
Knee or elbow (at or below).....	50.00—100.00
Arm or thigh.....	50.00—100.00
At shoulder.....	75.00—150.00
At hip.....	100.00—200.00
Breast.....	50.00—200.00

EXTIRPATIONS.

Tumors, superficial.....	5.00— 50.00
Tumors, deep-seated, (not abdominal).....	50.00—100.00
Organs, ovula.....	2.00— 5.00
Organs, kidney.....	100.00—300.00
Organs, testis.....	50.00—100.00
Organ, prostate.....	100.00—300.00
Foreign bodies.....	
Gallstones.....	100.00—500.00
Urinary calculus, cystic.....	50.00—100.00
Renal, calculus.....	100.00—500.00

EVAUATION.

(By aspiration or incision.)	
Pleural cavity.....	10.00— 50.00
Pericardial sac.....	25.00—200.00
Peritoneal cavity.....	10.00—100.00
Abscess cavities.....	5.00— 50.00
Joints.....	10.00— 50.00
Cystic tumors.....	5.00— 50.00
Bladder.....	5.00— 50.00
Hydracoele.....	2.00—10.00

REDUCTION OF FRACTURES.

Skull.....	\$ 25.00—100.00
Small.....	5.00—20.00
Maxilla.....	10.00—100.00
Clavicle.....	10.00—25.00
Scapula.....	15.00—25.00
Rib.....	5.00—10.00
Humerus.....	25.00—100.00
Radius or ulna.....	10.00—20.00
Humerus.....	5.00—20.00
Pelvis.....	25.00—50.00
Femur.....	25.00—100.00
Tibia.....	25.00—50.00
Fibula.....	10.00—25.00
Foot.....	10.00—25.00
Separation of epiphysis.....	10.00—20.00
Fracture with dislocation.....	
Hand.....	5.00—10.00
Fracture into a joint, extra.....	5.00—10.00
Double fracture, extra.....	5.00—10.00
Comminuted fracture, extra.....	10.00—15.00
Compound fracture, extra.....	10.00—15.00

REDUCTION OF DISLOCATIONS.

Of maxilla.....	10.00—20.00
At shoulder.....	10.00—25.00
At elbow.....	10.00—20.00
At wrist.....	5.00—15.00
Of phalanges.....	2.00— 5.00
At ankle.....	10.00—25.00
At knee.....	25.00—50.00
At hip.....	25.00—50.00

ORTHOPEDIC SURGERY.

Plaster dressing, limbs.....	5.00— 20.00
Plaster dressing, trunk.....	10.00— 50.00
Genus varum.....	10.00— 50.00
Genus valgum.....	10.00— 50.00
Tailpiece (club foot).....	10.00— 50.00
Pes cavus (hollow foot).....	5.00— 25.00
Pes planus (flat foot).....	5.00— 25.00
Halter's toes.....	5.00— 25.00
Hammer toe or finger.....	5.00— 25.00

Surgery of Special Regions.

SKIN (PLASTIC SURGERY)

Skin-grafting.....	\$ 25.00—500.00
Hare-lip, single.....	25.00— 50.00
Hare-lip, double.....	25.00—100.00
Rhinoplasty.....	10.00—100.00
Circumcision.....	10.00— 20.00
Phimosis or paraphimosis.....	2.00— 10.00

ABDOMEN.

Appendicitis.....	100.00—500.00
Abdominal section, (celiotomy or laparotomy).....	100.00—500.00
Hernia.....	
Strangling tumor.....	5.00— 50.00
Reduction of strangulated hernia.....	
Eya taxis.....	10.00— 25.00
Eya operation.....	100.00—500.00
Radical cure.....	100.00—500.00

RECTUM.

Examination.....	3.00— 10.00
Hemorrhoids, external.....	3.00— 15.00
Hemorrhoids, internal.....	15.00—100.00
Fistula in ano.....	15.00— 50.00
Pileus.....	5.00— 25.00
Stricture of rectum.....	25.00—100.00
Dilatation of sphincter.....	5.00— 10.00
Techno-rectal abscess.....	10.00— 50.00

EYE, EAR, NOSE AND THROAT.

OFFICE CONSULTATION.....	\$ 1.50— 10.00
OUTSIDE CALLS.....	2.00— 10.00
OUT OF CITY VISITS.....	half day \$25.00; whole day \$50.00

EYE EXAMINATIONS AND OPERATIONS.

Refraction.....	5.00— 10.00
Iridectomy.....	50.00—100.00
Cataracts.....	100.00—200.00
Enucleation of globe.....	75.00—150.00
Tonometry of recti muscles.....	50.00—100.00
Advancement of recti muscles.....	75.00—150.00
Operations on lids.....	5.00— 50.00
Removal foreign bodies.....	10.00— 50.00

EAR EXAMINATIONS AND OPERATIONS.

Complete examination.....	5.00— 10.00
Paracentesis of ear drum.....	5.00— 10.00
Mastoid, simple.....	20.00—50.00
Mastoid, radical.....	100.00—200.00

NOSE AND THROAT EXAMINATIONS AND OPERATIONS.

Complete examination.....	2.00— 5.00
A fenoids.....	25.00—50.00
Tonsil, enucleation.....	50.00—100.00
Tonsilomy.....	25.00—50.00
Tracheotomy.....	50.00—100.00
Intubation.....	50.00—100.00

Surgical Assistance Extra.

ADMINISTRATION OF ANESTHETIC.....	\$ 5.00—25.00
OPERATIVE ASSISTANT.....	5.00—25.00

Insurance Examinations.

Fratern and Industrial.....	\$ 1.00— 2.00
Old line.....	5.00—15.00

After Treatment not included in above prices.

Future Medical Meetings and Postgraduate Education

9TH ANNUAL CANCER SEMINAR of the Arizona Division American Cancer Society

January 12, 13 & 14, 1961
Tidelands Motor Inn — Tucson

"Changing Concepts in Tumor Formation and Therapy"

Tentative Program Thursday, January 12

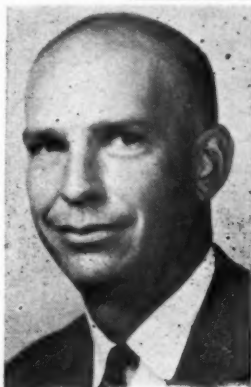
9:00 A.M.	Greetings — Dr. Lindsay E. Beaton, President, The Arizona Medical Association
9:15 A.M.	<i>Some Metabolic Approaches to Cancer</i>
	<i>Chemotherapy — Part I</i> Arnold D. Welch, Ph.D., M.D.
9:45 A.M.	<i>Immunology as It Relates to Cancer:</i>
	<i>Theoretical Aspects</i> Chester M. Southam, M.D.
10:30 A.M.	Break
	<i>The Polyoma Story</i> Arthur W. Ham, M.B.
11:15 A.M.	<i>Diagnostic and Therapeutic Studies on</i>
	<i>Cancer of the Adrenal</i> Roy Hertz, M.D.
12:00 Noon	Luncheon and Round Table
2:00 P.M.	<i>The Use of Limited Surgery and Maintenance Chemotherapy for the</i>
	<i>Management of Certain "Inoperable" Tumors</i> Jeanne C. Bateman, M.D.
2:30 P.M.	<i>Laboratory Studies in Cancer Chemotherapy with</i>
	<i>Fluorinated Pyrimidines</i> Charles Heidelberger, Ph.D.
3:00 P.M.	Break
3:15 P.M.	<i>Correlation of the Roentgenologic and Pathologic Findings in the</i>
	<i>Various Types of Primary Bone Tumors</i> C. Howard Hatcher, M.D.
3:45 P.M.	Question and Answer Session

Friday, January 13

9:15 A.M.	<i>Assessment of Environmental Agents in the</i>
	<i>Pathogenesis of Lung Cancer</i> Paul Kotin, M.D.
9:45 A.M.	<i>Indirect Mechanisms in Carcinogenesis</i> Henry S. Kaplan, M.D.
10:15 A.M.	Break
10:30 A.M.	<i>Some Metabolic Approaches to Cancer</i>
	<i>Chemotherapy — Part II</i> Arnold D. Welch, Ph.D., M.D.
11:15 A.M.	<i>Chemotherapy of Choriocarcinoma and</i>
	<i>Related Trophoblastic Tumors</i> Roy Hertz, M.D.
12:00 Noon	Luncheon
1:30 P.M.	<i>The Treatment of Bone Sarcomas in Selected</i>
	<i>Patients by Regional Resection</i> C. Howard Hatcher, M.D.
2:00 P.M.	<i>The Treatment of Advanced Metastatic Tumors</i> Jeanne C. Bateman, M.D.
2:30 P.M.	
2:45-4:00 P.M.	Panel: <i>Care of the Patient with Advanced Malignant Disease</i>
	Jeanne C. Bateman, M.D. Henry S. Kaplan, M.D.
	C. Howard Hatcher, M.D. Harold W. Kohl, M.D.
	Roy Hertz, Ph.D., M.D. Charles P. Neumann, M.D.

Saturday, January 14

- 9:15 A.M. *Clinical Pharmacology Studies with Fluorinated Pyrimidines* Charles Heidelberger, Ph.D.
- 9:45 A.M. *Immunology as it Relates to Cancer: Clinical Applications — Past Attempts and Future Possibilities* Chester M. Southam, M.D.
- 10:15 A.M. Break
- 10:30 A.M. *Host Factors in Relation to the Action of Environmental Carcinogenic Agents* Paul Kotin, M.D.
- 11:00 A.M. *Chemical Modification of Radiosensitivity* Henry S. Kaplan, M.D.
- 11:30 A.M. *Possible Tumor Viruses in Man* Arthur W. Ham, M.B.

**CHESTER SOUTHAM, M.D.**

M.D. College of Physicians and Surgeons, Columbia University 1947; associate professor of Medicine, Cornell University Medical College; attending physician to the Department of Medicine, Memorial Center.

Associate member of Sloan-Kettering Institute. Author and co-author of more than 55 publications related to research in the field of virology.

**CHARLES HEIDELBERGER, Ph.D.**

Ph.D. Organic Chemistry, Harvard 1946; co-authored the text, *Isotopic Carbon*; in 1948 joined the staff of the McArdle Memorial Labor-

atory of the University of Wisconsin; now holds the rank of Professor there.

In 1958 received the Teplitz Memorial Award in Cancer Research; serves as consultant in cancer chemotherapy to the National Service Center, National Institutes of Health, also chairman of its Bio-chemistry Committee; program chairman for both 1959 and 1960 for the American Association for Cancer Research. Has received one of the eight life-time professorships sponsored by the American Cancer Society. His research has dealt primarily with the mechanisms of chemical carcinogenesis and cancer chemotherapy; currently is writing a book in collaboration with Dr. Paul Kotin on carcinogenesis.

**JEANNE C. BATEMAN, M.D.**

Graduate George Washington University School of Medicine, Washington, D. C. 1942, cum laude; attending in Surgery in Oncology, Washington Hospital Center, Washington, D. C.

Consultant in Oncology and attending in Medicine, Prince George's Hospital; consultant in Oncology, Glenn Dale Sanitarium; consultant in Oncology, St. Elizabeth's Hospital; consultant to the Armed Forces Medical Library and to

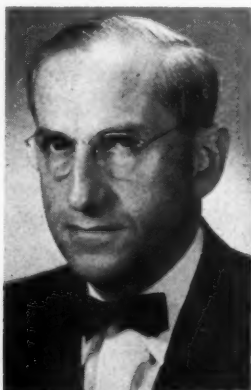
the National Cancer Institute; clinical instructor in Medicine, George Washington University School of Medicine. Author of more than 46 publications, most of which are related to chemotherapy of malignant growths.



PAUL KOTIN, M.D.

M.D. University of Illinois 1940; Paul Pierce Professor of Pathology, University of Southern California School of Medicine.

Diplomate American Board of Pathology; chairman, Interdepartmental Cancer Research Committee, USC; member, Committee for Research on Factors in Carcinogenesis, International Union Against Cancer; chairman, Subcommittee for the Role of Chemical Carcinogenic Agents Present in Air Pollution; special consultant to the Scientific Advisory Board of the Tobacco Industry Research Committee.



ROY HERTZ, M.D.

Ph.D. Physiology, University of Wisconsin 1933; M.D. University of Wisconsin 1939. As-

sociation in Endocrinology, Warwick Memorial Clinic for Cancer and Allied Diseases, consultant in Endocrinology at the same institute; attending physician at the General Hospital, Washington, D. C.; assistant clinical professor of Medicine, George Washington University Medical School; member, editorial board of the journal, *Endocrinology*.

Chairman of panel on Endocrinology and member of Executive Committee on Growth, National Research Council; chairman, Advisory Committee on Therapy, American Cancer Society. Chief, Endocrinology Branch, National Cancer Institute; member, editorial board, Society for Experimental Biology in Medicine. In 1957 received the Anne Frankel Rosenthal Memorial Award for Cancer Research. In conjunction with others is author of more than 99 publications, most of them relating to problems in Endocrinology.



HENRY S. KAPLAN, M.D.

Professor of Radiology, Executive Head of the Department of Radiology and Director of the Biophysics Laboratory School of Medicine, Stanford University.

M. D. Rush Medical College, University of Chicago 1940; member, Radiation Study Section, National Institute of Health; member, Physical Biology Training Grant Committee, National Institutes of Health; member of panel on Pathologic Effects of Atomic Radiation, National Academy of Sciences, National Research Council; member, Commission on Research, International Union Against Cancer; member, Research Advisory Council, American Cancer Society; member, National Advisory Cancer Council, United States Public Health Service.

ARIZONA HEART ASSOCIATION FOURTH ANNUAL CARDIAC SYMPOSIUM

January 27 and 28, 1961
ARIZONA BILTMORE HOTEL
Phoenix, Arizona

FRIDAY, JANUARY 27, 1961

- 8:00 - 9:00 Registration — Lobby Entrance
- 9:00 Greeting by Dr. William A. Butcher, Tucson, President — Arizona Heart Association.
- 9:15 - 10:00 Middle Age Fitness — Dr. Paul Dudley White, Boston.
- 10:00 - 10:45 The Treatment of Acute Cardiac Arrhythmias, Dr. E. Grey Dimond, La Jolla, California.
- 10:45 - 11:00 Intermission — Visit Exhibits.
- 11:00 - 11:45 Clinical Diagnosis of Congenital Heart Disease in the Adult — Dr. W. Proctor Harvey, Washington, D. C.
- 12:30 - 2:00 Luncheon at the Poolside.
- 2:00 - 2:45 Methods Available for Repair of Intracardiac Defects — Dr. Robert E. Gross, Boston.
- 2:45 - 3:30 The Role of Phonocardiography in Office Practice — Dr. E. Gray Dimond, La Jolla, California.
- 3:30 - 3:45 Intermission.
- 3:45 - 4:30 Panel Discussion of Current Cardiovascular Problems — Dr. James E. O'Hare and Dr. Leslie B. Smith, Moderators.

SATURDAY, JANUARY 28, 1961

- 8:30 - 9:30 Registration continued — Lobby.
- 9:30 Greeting by Dr. W. Shaw McDaniel, President-elect — Arizona Heart Association.
- 9:45 - 10:30 The Correction of Septal Defects — Dr. Robert E. Gross, Boston.

- 10:30 - 10:45 Intermission.
- 10:45 - 11:30 A Review of the Physiology and Diagnosis of Congenital Heart Disease in the Selection of Patients for Surgery — Dr. E. Grey Dimond, La Jolla, California.
- 12:00 - 2:00 Luncheon.
- 2:00 - 2:45 The Candidate for Cardiovascular Disease — Dr. Paul Dudley White, Boston.
- 2:45 - 3:30 Bacterial Endocarditis following Dental Procedures of Cleaning and/or Filling of Teeth — Dr. W. Proctor Harvey, Washington, D. C.
- 3:30 - 3:45 Intermission.
- 3:45 - 4:30 Panel Discussion of Current Cardiovascular Problems — Dr. Donald K. Buffmire and Dr. Andre J. Bruwer, Moderators.

THE ARIZONA MEDICAL ASSOCIATION 70TH ANNUAL MEETING

Safari Hotel, Scottsdale, Arizona
April 25 through 29, 1961

FACULTY

- Herb Adams, M.D.
Associate Professor of Radiology
Stanford University School of Medicine
Palo Verde, California
- Evan Calkins, M.D.
Director, Robert W. Lovett Memorial Unit
Massachusetts General Hospital
Boston, Massachusetts
- Mahlon Delp, M.D.
Chairman, Department of Medicine
University of Kansas Medical Center
Kansas City, Kansas
- Victor A. Drill, M.D.
Director of Biological Research
G. D. Searle and Company
Chicago, Illinois

Corwin Hinshaw, Sr., M.D.
Professor of Medicine
Stanford University School of Medicine
San Francisco, California

Robert T. Manning, M.D.
Associate in Medicine
University of Kansas Medical Center
Kansas City, Kansas

John H. Mulholland, M.D.
Professor of Surgery
University of New York College of Medicine
New York, New York

John Rebeck, M.D., Ph.D.
Hematology
Henry Ford Hospital
Detroit, Michigan

Subject: "Extended Operations on the Intestinal Tract."

Tuesday, February 14, 1961 — Casa Blanca Inn, Scottsdale, Arizona

Speaker: Dr. Richard B. Cattell, Chief of Surgery, Lahey Clinic, Boston, Massachusetts.

Subject: "Surgery of the Biliary Tract."

Tuesday, April 11, 1961 — Casa Blanca Inn, Scottsdale, Arizona

Speaker: Dr. William D. Longmire, Jr. Professor of Surgery University of California, Los Angeles).

Subject: "Surgery of Thyroids and/or Parathyroids."

Tuesday, May 9, 1961 — Place to be announced later.

Speaker: Dr. Isidor S. Ravdin, President American College of Surgeons, 1961, John Rhea Barton Professor of Surgery University of Pennsylvania.

Subject: To be announced later.

PHOENIX SURGICAL SOCIETY

The following scientific meetings of the Phoenix Surgical Society have been arranged for the coming year. They will be held, except the last meeting at Casa Blanca Inn, Scottsdale, Arizona on the dates listed below. The place and subject of the fourth meeting will be announced later. All physicians and surgeons are cordially invited to the dinner and cocktails preceding these lectures. Dinner to be approximately \$5.50 per plate, payable at door. Please send reservations, not later than a week in advance of each meeting to Secretary, Phoenix Surgical Society, Dr. W. H. Cleveland, 1313 N. 2nd St., Phoenix, Arizona. All interested in attending the lecture and not the dinner will be welcome free of charge, reservation not necessary. Dinner 6:30 P.M. Lecture 8:00 P.M.

Thursday, December 15, 196 — Casa Blanca Inn, Scottsdale, Arizona

Speaker: Dr. Owen H. Wagensteen — President American College of Surgeons 1960; Chairman Dept. of Surgery and Prof. of Surgery University of Minnesota, Minneapolis, Minnesota.

AMERICAN COLLEGE OF SURGEONS MEETING IN MEXICO CITY JANUARY 23 THROUGH 26, 1961

Developments in surgical techniques will be discussed by leading surgeons of Mexico, Canada and the United States at the first meeting of the American College of Surgeons to be held in Mexico.

For detailed information, write to: Dr. William E. Adams, Secretary, American College of Surgeons, 40 East Erie Street, Chicago 11, Illinois.

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comprehensive relief

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Benadryl [®] hydrochloride	56 mg.
(diphenhydramine hydrochloride, Parke-Davis)	
Dihydrocodeinone bitartrate	1/6 gr.
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Potassium guaiacolsulfonate	8 gr.
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Supplied: Bottles of 16 ounces and 1 gallon.

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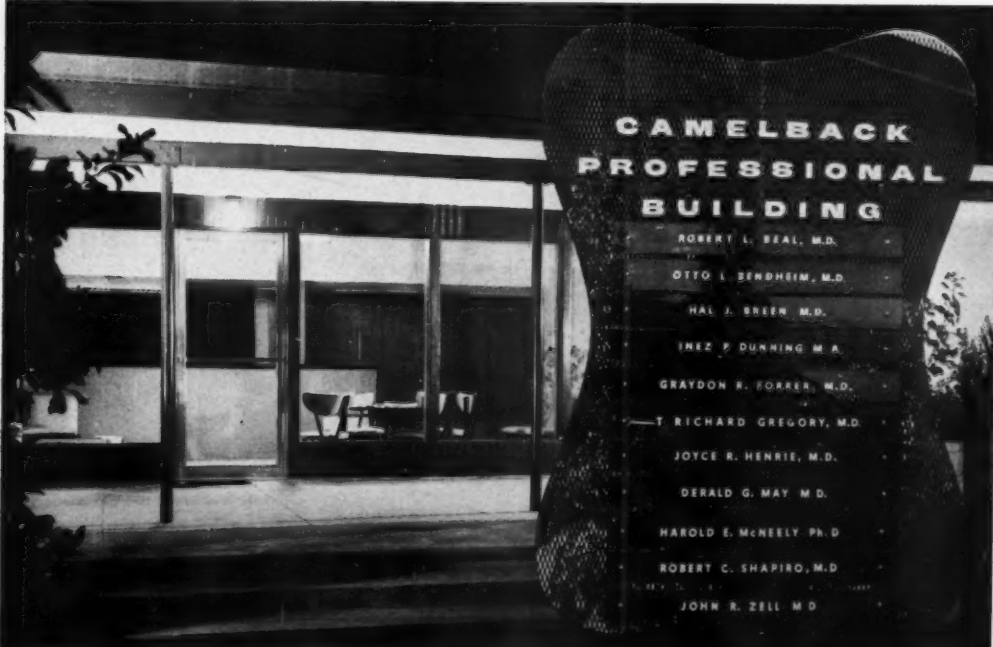
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This unusual book is aimed at the needs of the general practitioner, general surgeon and industrial physician—the men who see hand injuries first. Full page plates and explicit text give you quick instructions on treating every type of hand injury you are likely to see—from lacerations and puncture wounds to fractures and crushing injuries.

Extensive coverage is given to closed injuries of the hand and their management: contusions, swellings,

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By HENRY C. MARBLE, M.D., F.A.C.S., Consulting Surgeon to the Massachusetts General Hospital. 207 pages, 6½"x9¼", illustrated. \$7.00. Ready January!

New!—Solid Information on Every Phase of Modern Hypnotic Practice Meares—A System of Medical Hypnosis

Here is sound advice on how to apply-hypnosis safely and effectively in your everyday practice. Dr. Meares gives step-by-step instructions for each method of induction: by direct stare; by suggestions for relaxation; by arm levitation; etc. He gives practical help on choosing the right method of induction for a particular case.

You'll find suggestions for clinical use of hypnosis in relief of pain and insomnia; as an aid to diagnosis;

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By AINSLIE MEARES, M.D., D.M.P., Melbourne, Australia. President, International Society for Clinical and Experimental Hypnosis. 484 pages, 6"x9¼". About \$10.00. New—Just Ready!

New!—Sound Advice on Meeting Hundreds of Surgical Hazards Artz & Hardy—Complications in Surgery & Their Management

With the aid of 69 authorities, the editors have compiled a complete text on the pitfalls of surgery—from preoperative preparation through post-operative convalescence. The authors cover general complications that may occur in almost any type of surgery, such as infections, wound dehiscence, shock, transfusion reactions, etc. Next, the management of special problems of severe pain, anesthetic complications, nutritional problems and emotional crises is clearly described. More than half of the book is de-

voted to the specific complications that arise in particular surgical operations.

Comprehensive chapters detail complications of: antibiotic therapy—radiation therapy—pulmonary resection—splenectomy—appendectomy—pediatric surgery—hernia repair—surgery of the breast—common fractures—burns—etc.

Edited by CURTIS P. ARTZ, M.D., F.A.C.S., Associate Professor of Surgery; and JAMES D. HARDY, M.D., F.A.C.S., Professor and Chairman of the Department of Surgery, University of Mississippi. With Contributions by 69 other Authorities. 1075 pages, 7"x10", with 271 illustrations. \$23.00. New!



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*From a clinical investigator's report to Merck Sharp & Dohme.

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StaphcillinTM

sodium dimethoxyphenyl penicillin
FOR INJECTION

UNIQUE—BECAUSE IT
RETAINS ANTIBACTERIAL
ACTIVITY IN THE PRESENCE OF
STAPHYLOCOCCAL PENICILLINASE
WHICH INACTIVATES
OTHER PENICILLINS



STAPHCILLIN™

(sodium dimethoxyphenyl penicillin)

For Injection

DESCRIPTION

STAPHCILLIN is a unique new synthetic parenteral penicillin produced by Bristol Laboratories for the specific treatment of staphylococcal infections due to resistant organisms. Its uniqueness resides in its property of resisting inactivation by staphylococcal penicillinase. It is active against strains of staphylococci which are resistant to other penicillins.

Each dry filled vial contains: 1 Gm. STAPHCILLIN (sodium dimethoxyphenyl penicillin), equivalent to 900 mg. dimethoxyphenyl penicillin activity.

INDICATIONS

STAPHCILLIN is recommended as specific therapy only in infections due to strains of staphylococci resistant to other penicillins, e.g.:

Skin and soft tissue infections: cellulitis, wound infections, carbuncles, pyoderma, furunculosis, lymphangitis and lymphadenitis.

Respiratory infections: staphylococcal lobar or bronchopneumonia, and lung abscesses combined with indicated surgical treatment.

Other infections: staphylococcal septicemia, bacteremia, acute or subacute endocarditis, acute osteomyelitis and enterocolitis.

Infections due to penicillin-sensitive staphylococci, streptococci, pneumococci and gonococci should be treated with Syncillin® or parenteral penicillin G rather than STAPHCILLIN. Treponemal infections should be treated with parenteral penicillin G.

DOSAGE AND ADMINISTRATION

STAPHCILLIN is well tolerated when given by deep intragluteal or intravenous injection.

As is the case with other antibiotics, the duration of therapy should be determined by the clinical and bacteriological response of the patient. Therapy should be continued for at least 48 hours after the patient has become afebrile, asymptomatic and cultures are negative. The usual duration has been 5-7 days.

Intramuscular route: The usual adult dose is 1 Gm. every 4 or 6 hours. Infants' and children's dosage is 25 mg. per Kg. (approximately 12 mg. per pound) every 6 hours.

Intravenous route: 1 Gm. every 6 hours using 50 ml. of sterile saline solution at the rate of 10 ml. per minute.

**Warning:* Solutions of STAPHCILLIN and kanamycin should not be mixed, as they rapidly inactivate each other. Data on the results of mixing STAPHCILLIN with other antibiotics are being accumulated.

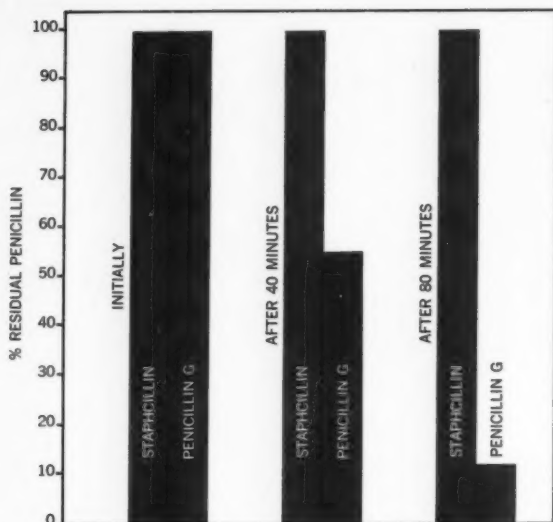
DIRECTIONS FOR RECONSTITUTION

Add 1.5 ml. sterile distilled water or normal saline to a 1 Gm. vial and shake vigorously. Withdraw the clear, reconstituted solution (2.0 ml.) into a syringe and inject. The reconstituted solution contains 500 mg. of STAPHCILLIN per ml. Reconstituted solutions are stable for 24 hours under refrigeration.

For intravenous use, dilute the reconstituted dose in 50 ml. of sterile saline and inject at the rate of 10 ml. per minute.

*This statement supersedes that in the Official Package Circulars dated September and/or October, 1960.

(continued)



In the presence of staphylococcal penicillinase, STAPHCILLIN remained active and retained its antibacterial action. By contrast, penicillin G was rapidly destroyed in the same period of time. (After Gourevitch et al., to be published)

Specifically for "resistant" staph...

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sodium dimethoxyphenyl penicillin
FOR INJECTION

The failure of staphylococcal infections to respond to penicillin therapy is attributed to the penicillin-destroying enzyme, penicillinase, produced by the invading staphylococcus.

Unlike other penicillins:

- 1 STAPHCILLIN is effective, because it retains its antibacterial activity despite the presence of staphylococcal penicillinase.
- 2 The clinical effectiveness of STAPHCILLIN has been confirmed by dramatic results in a wide variety of infections due to "resistant" staphylococci, many of which were serious and life-threatening.

Like other penicillins:

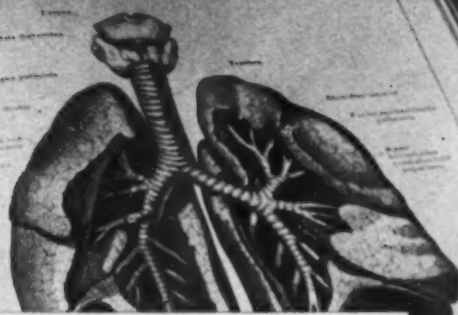
STAPHCILLIN has no significant systemic toxicity. It is well tolerated locally, and pain or irritation at the injection site is comparable to that following the injection of penicillin G. *In occasional cases, typical penicillin reactions may be experienced.*

PROFESSIONAL INFORMATION SERVICE — The attached Official Package Circular provides complete information on the indications, dosage, and precautions for the use of STAPHCILLIN. If you desire additional information concerning clinical experiences with STAPHCILLIN, the Medical Department of Bristol Laboratories is at your service. You may direct your inquiries via collect telephone call to New York, PLaza 7-7061, or by mail to Medical Department, Bristol Laboratories, 630 Fifth Ave., N. Y. 20, N. Y.

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Recovery uneventful.

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Synceillin Tablets - 250 mg. (400,000 units) ... Synceillin Tablets - 125 mg. (200,000 units)

Synceillin for Oral Solution - 60 ml. bottles - when reconstituted, 125 mg. (200,000 units) per 5 ml.

Synceillin Pediatric Drops - 1.5 Gm. bottles. Calibrated dropper delivers 125 mg. (200,000 units)

*Streptococcal infections should be treated for at least 10 days to prevent the development of rheumatic fever and as prophylaxis against bacterial endocarditis in susceptible patients.

Complete information on indications, dosage and precautions is included in the circular accompanying each package.

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Planolar combines the cumulative antirheumatic and anti-inflammatory action of Plaquenil® with the prompt analgesic action of aspirin.

Each tablet contains: Plaquenil 60 mg.
Aspirin 300 mg. (5 grains)

Plaquenil "...the preferred antimalarial drug for treatment of disorders of connective tissue..."¹

Aspirin belongs to "...the most useful group of drugs for rheumatoid arthritis."²

WRITE:

for detailed information
(clinical experience, side
effects, precautions, etc.)

HOW SUPPLIED: Bottles of 100 tablets.

Winthrop LABORATORIES
New York 18, N. Y.

DOSAGE: Adults, 2 tablets two or three times daily. After two or three months of therapy, the patient may no longer need the added benefit of aspirin. A maintenance regimen of Plaquenil sulfate alone (from 200 to 400 mg. daily) may then be substituted.

REFERENCES:

1. Scherbel, A. L.; Schuchter, S. L., and Harrison, J. W.: *Cleveland Clin. Quart.* 24:98, April, 1957.
2. Waine, Hans: *Arthritis, rheumatoid*, in Conn, H. F.: *Current Therapy* 1959, Philadelphia, W. B. Saunders Co., 1959, p. 565.

*Planolar, trademark



limit the
blood pressure
swing

Rautrax-N lowers high blood pressure gently, gradually... protects against sharp fluctuations in the normal pressure swing. Rautrax-N combines Raudixin, the cornerstone of antihypertensive therapy, with Naturetin, the new, safer diuretic-antihypertensive agent. The complementary action of the components permits a lower dose of each thus reducing the incidence of side effects. The result: Maximum effectiveness, minimal dosage, enhanced safety. Rautrax-N also contains potassium chloride — for added protection against possible potassium depletion during maintenance therapy.

Supply: Rautrax-N — capsule-shaped tablets — 50 mg. Raudixin, 4 mg. Naturetin, and 400 mg. potassium chloride. Rautrax-N Modified — capsule-shaped tablets — 50 mg. Raudixin, 2 mg. Naturetin, and 400 mg. potassium chloride. For complete information write Squibb, 745 Fifth Avenue, New York 22, N. Y.



Rautrax-N

Squibb Standardized Whole Root Rauwolfia Serpentina (Raudixin) and Benzhydroflumethiazide (Naturetin) with Potassium Chloride

RAUDIXIN, RAUTRAX, AND NATURETIN ARE SQUIBB TRADEMARKS.

Squibb Quality—The
Proven Ingredient



NEW PROTEIN TISSUE-BUILDING AGENT ADROYD[®] oxymetholone Parke-Davis

FOR SIGNIFICANT ANABOLIC GAINS IN: ASTHENIA (UNDER-WEIGHT, ANOREXIA, LACK OF VIGOR); CONVALESCENCE FROM SURGERY OR SEVERE INFECTIONS; WASTING DISEASES; BURNS; FRACTURES; OSTEOPOROSIS; AND IN OTHER CATABOLIC STATES

■ PROMOTES AND MAINTAINS POSITIVE NITROGEN BALANCE ■ HELPS RESTORE APPETITE, STRENGTH, AND VIGOR ■ BUILDS FIRM, LEAN MUSCULAR TISSUE ■ FAVORABLY INFLUENCES CALCIUM AND PHOSPHORUS METABOLISM ■ PROMOTES A SENSE OF WELL-BEING

ADROYD PROVIDES HIGH ANABOLIC ACTIVITY—The tissue-building potential of ADROYD exceeds its androgenic action to the extent that masculinizing effects have not been a problem in clinical use.* Other advantages of ADROYD are: Neither estrogenic nor progestational. No significant fluid retention. Apparent freedom from nausea, vomiting, and other gastrointestinal disturbances. Effective by the oral route.

See medical brochure, available to physicians, for details of administration and dosage.

Supplied: 10-mg, scored tablets, bottles of 30.

48760

PARKE-DAVIS

*Reports to Department of Clinical Investigation, Parke, Davis & Company, 1958 and 1959.

PARKE, DAVIS & COMPANY • DETROIT 32, MICHIGAN

Availa
New I

*specific
for
tension
headache...*



FIORINAL[®]

*relieves pain,
muscle spasm,
nervous tension*

rapid action • non-narcotic • economical

"We have found caffeine, used in combination with acetylsalicylic acid, acetophenetidin, and isobutylallylbarbituric acid, [Fiorinal] to be one of the most effective medicaments for the symptomatic treatment of headache due to tension."

Friedman, A. P., and Merritt, H. H.: J.A.M.A. 163:1111 (Mar. 30) 1957.

Available: Fiorinal Tablets and
New Form — Fiorinal Capsules

Each contains: Sandoptal (Allylbarbituric Acid N.F. X)
50 mg. (3/4 gr.), caffeine 40 mg. (2/3 gr.), acetylsalicylic acid
200 mg. (3 gr.), acetophenetidin 130 mg. (2 gr.).

Dosage: 1 or 2 every four hours, according to need, up to 6 per day.



Blue Cross - Blue Shield

Blue Cross - Blue Shield

BLUE CROSS - BLUE SHIELD

Blue Cross / Blue Shield

Blue Cross-Blue Shield

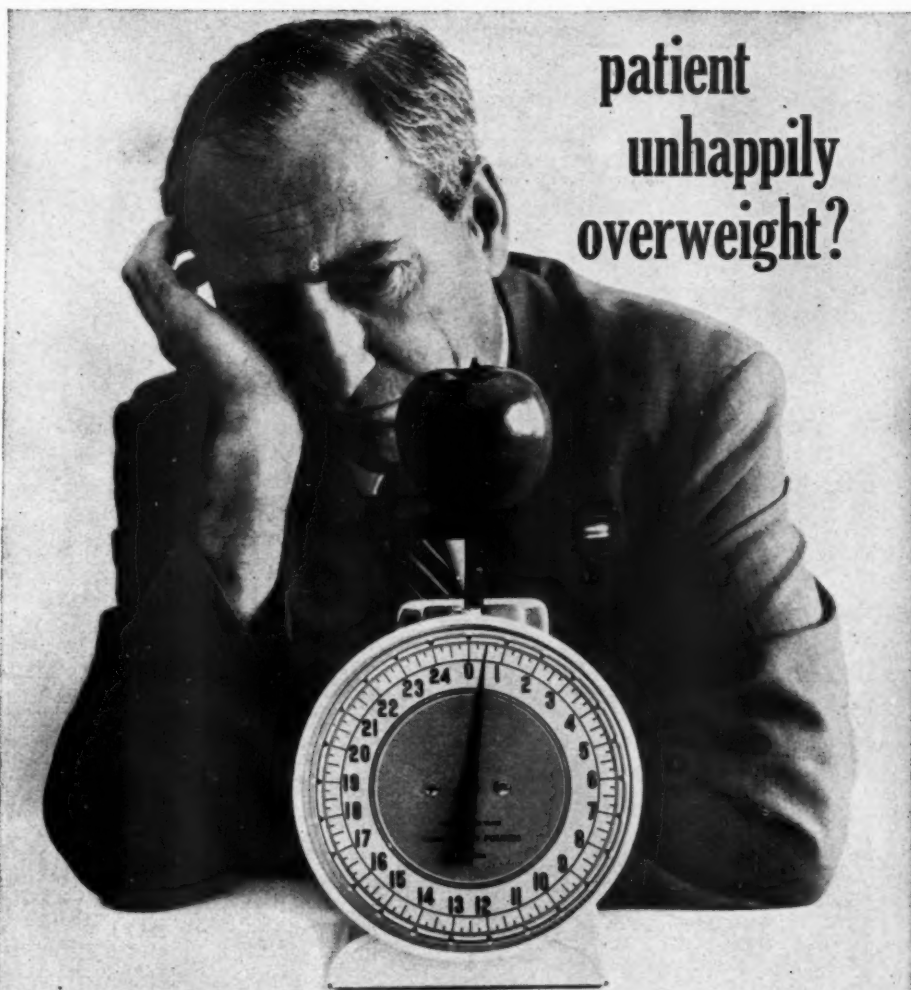
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BLUE CROSS - BLUE SHIELD

no matter what the type face is, it still spells out the

finest hospital-medical-surgical coverage there is.



patient
unhappily
overweight?

minimize care and eliminate despair with
'METHEDRINE'

brand Methamphetamine Hydrochloride

Controls food craving, keeps the reducer happy—In obesity, "our drug of choice has been methedrine . . . because it produces the same central effect with about one-half the dose required with plain amphetamine, because the effect is more prolonged, and because undesirable peripheral effects are significantly minimized or entirely absent." Literature available on request.

Supplied: Tablets 5 mg., scored. Bottles of 100 and 1000.

¹ Douglas, H. S.: West. J. Surg. 59:238 (May) 1951.



BURROUGHS WELLCOME & CO. (U. S. A.) INC., Tuckahoe, New York

for chronic bronchitis

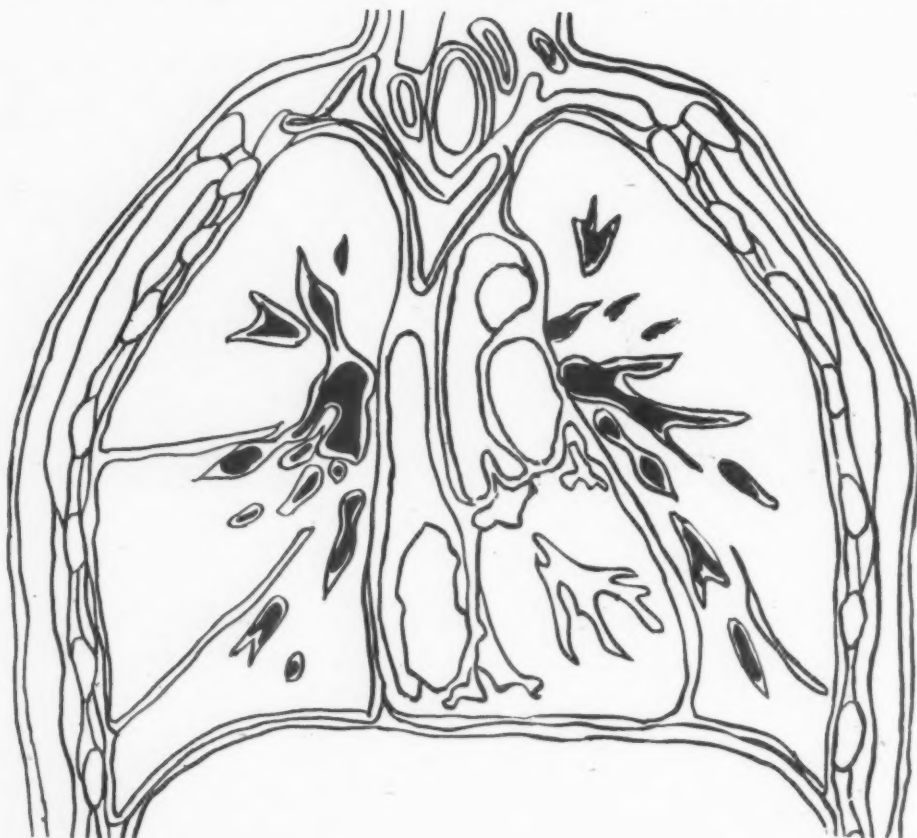
Tetrex[®]

capsules

The Original Tetracycline Phosphate Complex

U.S. PAT. NO. 2,791,609

effective control of pathogens...with an unsurpassed record of safety and tolerance



BRISTOL LABORATORIES, SYRACUSE, NEW YORK
Div. of Bristol-Myers Co.



SUPPLY: TETREX Capsules—tetracycline[®]phosphate complex—each equivalent to 250 mg. tetracycline HCl activity. Bottles of 16 and 100.

TETREX Syrup—tetracycline (ammonium polyphosphate buffered) syrup—equivalent to 125 mg. tetracycline HCl activity per 5 ml. teaspoonful. Bottles of 2 fl. oz. and 1 pint.



Note the two tablets on the shelf above. Left, old-style sugar-coated Daylets-M®. Right, the same formula, but *Filmtab*-coated—potency's assured, but old-style bulk is cut 30%.

ON COATS:

STYLES CHANGE IN VITAMINS, TOO

Coat styles change—whether it's a blazer or a B-complex vitamin. Not long ago, for instance, "Vitamins by Abbott" were dressed up with a new-style coating—*Filmtab*®.

The most obvious result was a marked reduction in tablet size—up to 30% in some products. The tablets themselves were brilliant in a variety of rainbow colors. They wouldn't chip or stick together in the bottle. All vitamin tastes and odors—gone.

Such were the aesthetic gains. Behind these, a significant pharmaceutical advance: with *Filmtab*, deterioration is slowed

to an irreducible minimum, because the coating process is essentially a water-free procedure.

Finally—most important—*Filmtab* guarantees that the content of each tablet matches the formula printed on the label. While the person taking the vitamins may not worry much about rigid stability, Abbott does. *Assures* it, through *Filmtab*.

In short, *Filmtab*'s a name that stands for quality, stability, potency. The very best in vitamin coatings. *Filmtab* doesn't add a penny to the cost. And it's a name found *only* on



VITAMINS by ABBOTT



NEWEST
NUTRITIONAL
PRODUCT
FROM ABBOTT

To meet special nutritional needs of growing teenagers...

Filmtab® **DAYTEENS**
TRADEMARK

- RICH IN IRON, CALCIUM, VITAMINS—IMPORTANT FACTORS FOR THE GROWTH YEARS
- FILMTAB-COATED TO CUT SIZE AND ASSURE FULL POTENCY
- HANDSOME TABLE BOTTLES AT NO EXTRA COST (100-SIZE)
- ALSO SUPPLIED IN BOTTLES OF 250 AND 1000.

NOW, DAYTEENS JOINS THE COMPLETE LINE OF QUALITY VITAMINS BY ABBOTT:

FILMTAB
JAYALETS®
Tablet bottles of 100
Bottles of 50 and 250

FILMTAB
JAYALETS-M®
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of 100 and 250

Extra-potent maintenance
formulas—ideal for the
"nutritionally run-down"

FILMTAB
OPTILETS®
FILMTAB
OPTILETS-M®
Tablet bottles of
30 and 100
Bottles of 1000

Therapeutic formulas
for more severe de-
ficiencies—illness,
infection, etc.

FILMTAB
SUR-BEX® with C
Tablet bottle of 60
Bottles of 100,
500 and 1000

Therapeutic formula of
the essential B-complex
plus C, for convalescence,
stress, post-surgery, etc.

EACH DAYTEENS FILMTAB® REPRESENTS:

Vitamin A.....	(5000 units) 1.5 mg.
Vitamin D.....	(1000 units) 25 mcg.
Thiamine Mononitrate (B ₁).....	2 mg.
Riboflavin (B ₂).....	2 mg.
Nicotinamide.....	20 mg.
Pyridoxine Hydrochloride.....	0.5 mg.
Vitamin B ₁₂ (as cobalamin concentrate).....	2 mcg.
Calcium Pantothenate.....	5 mg.
Ascorbic Acid (C).....	50 mg.
Iron (as sulfate).....	10 mg.
Copper (as sulfate).....	0.15 mg.
Iodine (as calcium iodate).....	0.1 mg.
Manganese (as sulfate).....	0.05 mg.
Magnesium (as oxide).....	0.15 mg.
Calcium (as phosphate).....	250 mg.
Phosphorus (as calcium phosphate).....	193 mg.

VITAMINS by ABBOTT

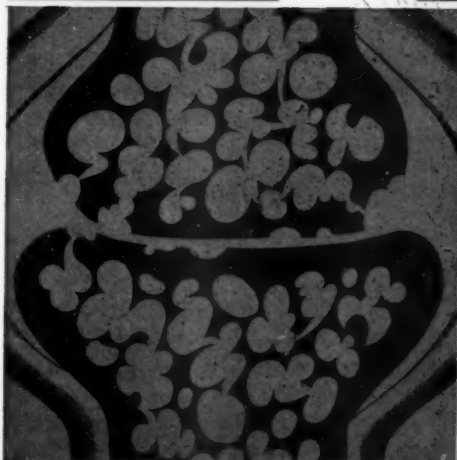


in rheumatic disorders

whenever aspirin
proves inadequate

Sterazolidin

brand of prednisone-phenylbutazone



Even in the more transient rheumatic disorders, an anti-inflammatory effect more potent than that provided by aspirin is often desirable to hasten recovery and get the patient back to work. By combining the anti-inflammatory action of prednisone and phenylbutazone, Sterazolidin brings about exceptionally rapid resolution of inflammation with relief of symptoms and restoration of function. Since Sterazolidin is effective in low dosage, the possibility of significant hypercortisonism, even in long-term therapy, is substantially reduced.



Formulation: Each Sterazolidin® capsule contains prednisone 1.25 mg.; Butazolidin® brand of phenylbutazone, 50 mg.; dried aluminum hydroxide gel 100 mg.; magnesium trisilicate 150 mg.; and homatropine methylbromide 1.25 mg. Bottles of 100 capsules.

Geigy, Ardsley, New York

Geigy

"Gratifying" relief from

*for your patients with
'low back syndrome' and
other musculoskeletal disorders*

POTENT muscle relaxation

EFFECTIVE pain relief

SAFE for prolonged use

stiffness and pain

“gratifying” *relief from stiffness and pain*
in 106-patient controlled study
(as reported in J.A.M.A., April 30, 1960)

“Particularly gratifying was the drug’s [SOMA’s] ability to relax muscular spasm, relieve pain, and restore normal movement . . . Its prompt action, ability to provide objective and subjective assistance, and freedom from undesirable effects recommend it for use as a muscle relaxant and analgesic drug of great benefit in the conservative management of the ‘low back syndrome.’”

*Kestler, O.: Conservative Management of “Low Back Syndrome”,
J.A.M.A. 172: 2039 (April 30) 1960.*

FASTER IMPROVEMENT—79% complete or marked improvement in 7 days (Kestler)

EASY TO USE—Usual adult dose is one 350 mg. tablet three times daily and at bedtime.

SUPPLIED: 350 mg., white tablets, bottles of 50.
For pediatric use, 250 mg., orange capsules, bottles of 50.

Literature and samples on request.

SOMA[®]

(CARISOPRODOL, WALLACE)



WALLACE LABORATORIES, CRANBURY, NEW JERSEY

Bone section: erosion
and purulent exudate



A large, dark, grainy microscopic image of bacteria, likely staphylococci, filling the left half of the advertisement. The bacteria appear as numerous small, dark, irregular clusters and individual cells.

in osteomyelitis

Therapeutic confidence

Panalba is effective against more than 30 commonly encountered pathogens including ubiquitous staphylococci. Right from the start, prescribing it gives you a high degree of assurance of obtaining the desired anti-infective action in this as in a wide variety of bacterial diseases.

Supplied: Capsules, each containing Panmycin* Phosphate (tetracycline phosphate complex), equivalent to 250 mg. tetracycline hydrochloride, and 125 mg. Albamycin,* as novobiocin sodium, in bottles of 16 and 100.

*Trademark, Reg. U. S. Pat. Off.

The Upjohn Company
Kalamazoo, Mich

Upjohn

Panalba*

your broad-spectrum
antibiotic of *first* resort



*an antibiotic improvement
designed to provide
greater therapeutic effectiveness*



now
Pulvules®
Ilosone®

(propionyl erythromycin ester lauryl sulfate, Lilly)

*in a more acid-stable form
assure adequate absorption even when taken with food*

Ilosone retains 97.3 percent of its antibacterial activity after exposure to gastric juice (pH 1.1) for forty minutes.¹ This means there is more antibiotic available for absorption—greater therapeutic activity. Clinically, too, Ilosone has been shown^{2,3} to be decisively effective in a wide variety of bacterial infections—with a reassuring record of safety.⁴

*Usual dosage for adults and for children over fifty pounds is 250 mg. every six hours.
Supplied in 125 and 250-mg. Pulvules and in suspension and drops.*

1. Stephens, V. C., et al.: J. Am. Pharm. A. (Scient. Ed.), 48:620, 1959.
2. Salitsky, S., et al.: Antibiotics Annual, p. 893, 1959-1960.
3. Reichelderfer, T. E., et al.: Antibiotics Annual, p. 899, 1959-1960.
4. Kuder, H. V.: Clin. Pharmacol. & Therap., in press.

ELI LILLY AND COMPANY • INDIANAPOLIS 6, INDIANA, U.S.A.

032884





LOMOTIL

SELECTIVELY LOWERS PROPULSIVE MOTILITY

LOMOTIL represents a major advance over the opium derivatives in controlling the propulsive hypermotility occurring in diarrhea.

Precise quantitative pharmacologic studies demonstrate that Lomotil controls intestinal propulsion in approximately $\frac{1}{11}$ the dosage of morphine and $\frac{1}{20}$ the dosage of atropine and that therapeutic doses of Lomotil produce few or none of the diffuse untoward effects of these agents.

Clinical experience in 1,314 patients amply supports these findings. Even in such a severe test of antidiarrheal effectiveness as the colonic hyperactivity in patients with colectomy, Lomotil is effective in significantly slowing the fecal stream.

Whenever a paregoric-like action is indicated, Lomotil now offers positive antidiarrheal control... with safety and greater convenience. In addition,

as a nonrefillable prescription product, Lomotil offers the physician full control of his patients' medication.

PRECAUTION: While it is necessary to classify Lomotil as a narcotic, no instance of addiction has been encountered in patients taking therapeutic doses. The abuse liability of Lomotil is comparable with that of codeine. Patients have taken therapeutic doses of Lomotil daily for as long as 300 days without showing withdrawal symptoms, even when challenged with nalorphine.

Recommended dosages should not be exceeded.

DOSAGE: The recommended initial dosage for adults is two tablets (5 mg.) three or four times daily, reduced to meet the requirements of each patient as soon as the diarrhea is controlled. Maintenance dosage may be as low as two tablets daily. Lomotil, brand of diphenoxylate hydrochloride with atropine sulfate, is supplied as unscored, uncoated white tablets of 2.5 mg., each containing 0.025 mg. ($\frac{1}{4000}$ gr.) of atropine sulfate to discourage deliberate overdose.



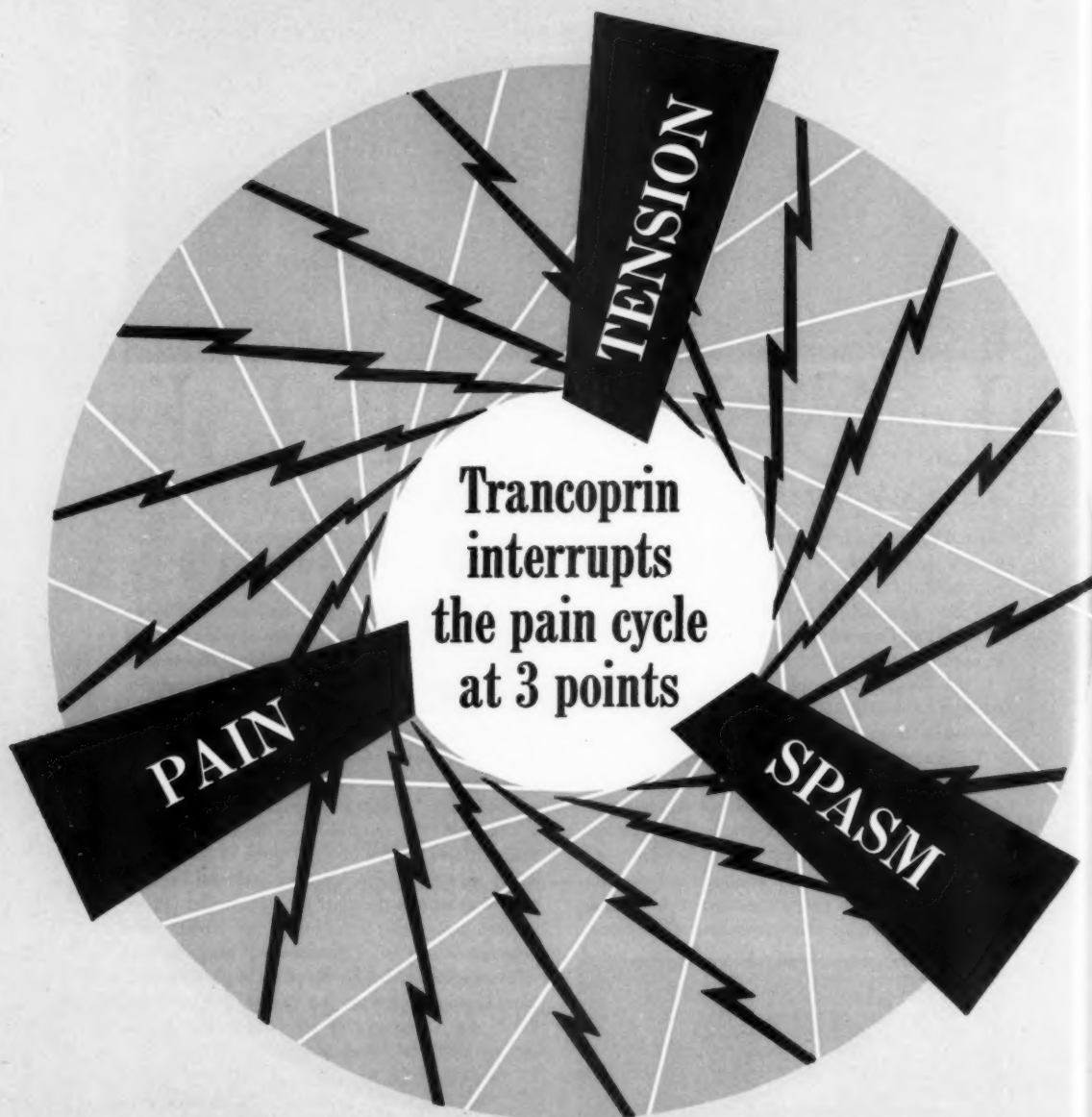
EFFICACY AND SAFETY of Lomotil are indicated by its low median effective dose. As measured by inhibition of charcoal propulsion in mice, Lomotil was effective in about $\frac{1}{11}$ the dosage of morphine hydrochloride and in about $\frac{1}{20}$ the dosage of atropine sulfate.

Subject to Federal Narcotic Law.

Descriptive literature and directions for use available in Physicians' New Product Brochure No. 81 from

G. D. SEARLE & CO.
P. O. Box 5110, Chicago 80, Illinois
Research in the Service of Medicine

announcing...
Trancoprin[®]
acetylsalicylic acid (300 mg.) and chlormezanone (50 mg.)
Tablets



a broad spectrum non-narcotic analgesic

Trancoprin, a new analgesic, not only raises the pain perception threshold but, through its chlormezanone component, also relaxes skeletal muscle spasm¹⁻⁶ and quiets the psyche.^{2,3-5,7}

The effectiveness of Trancoprin has been demonstrated clinically⁸ in a number of patients with a wide variety of painful disorders ranging from headache, dysmenorrhea and lumbago to arthritis and sciatica. In a series of 862 patients,⁸ Trancoprin brought excellent or good relief of pain to 88 per cent of the group. In another series,⁹ Trancoprin was administered in an industrial dispensary to 61 patients with headache, bursitis, neuritis or arthritis. The excellent results obtained prompted the prediction that Trancoprin "... will prove a valuable and safe drug for the industrial physician."⁹

Exceptionally Safe

No serious side effects have been encountered with Trancoprin. Of 923 patients treated with Trancoprin, only 22 (2.4 per cent) experienced any side effects.^{8,9} In every instance, these reactions, which included temporary gastric distress, weakness or sedation, were mild and easily reversed.

Indications

Trancoprin is recommended for more comprehensive control of the pain complex (pain → tension → spasm) in those disorders in which tension and spasm are complicating factors, such as: headaches, including tension headaches / premenstrual tension and dysmenorrhea / low back pain, sciatica, lumbago / musculoskeletal pain associated with strains or sprains, myositis, fibrositis, bursitis, trauma, disc syndrome and myalgia / arthritis (rheumatoid or hypertrophic) / torticollis / neuralgia.

Dosage

The usual adult dosage is 2 Trancoprin tablets three or four times daily. The dosage for children from 5 to 12 years of age is 1 tablet three or four times daily. Trancoprin is so well tolerated that it may be taken on an empty stomach for quickest effect. The relief of symptoms is apparent in from fifteen to thirty minutes after administration and may last up to six hours or longer.

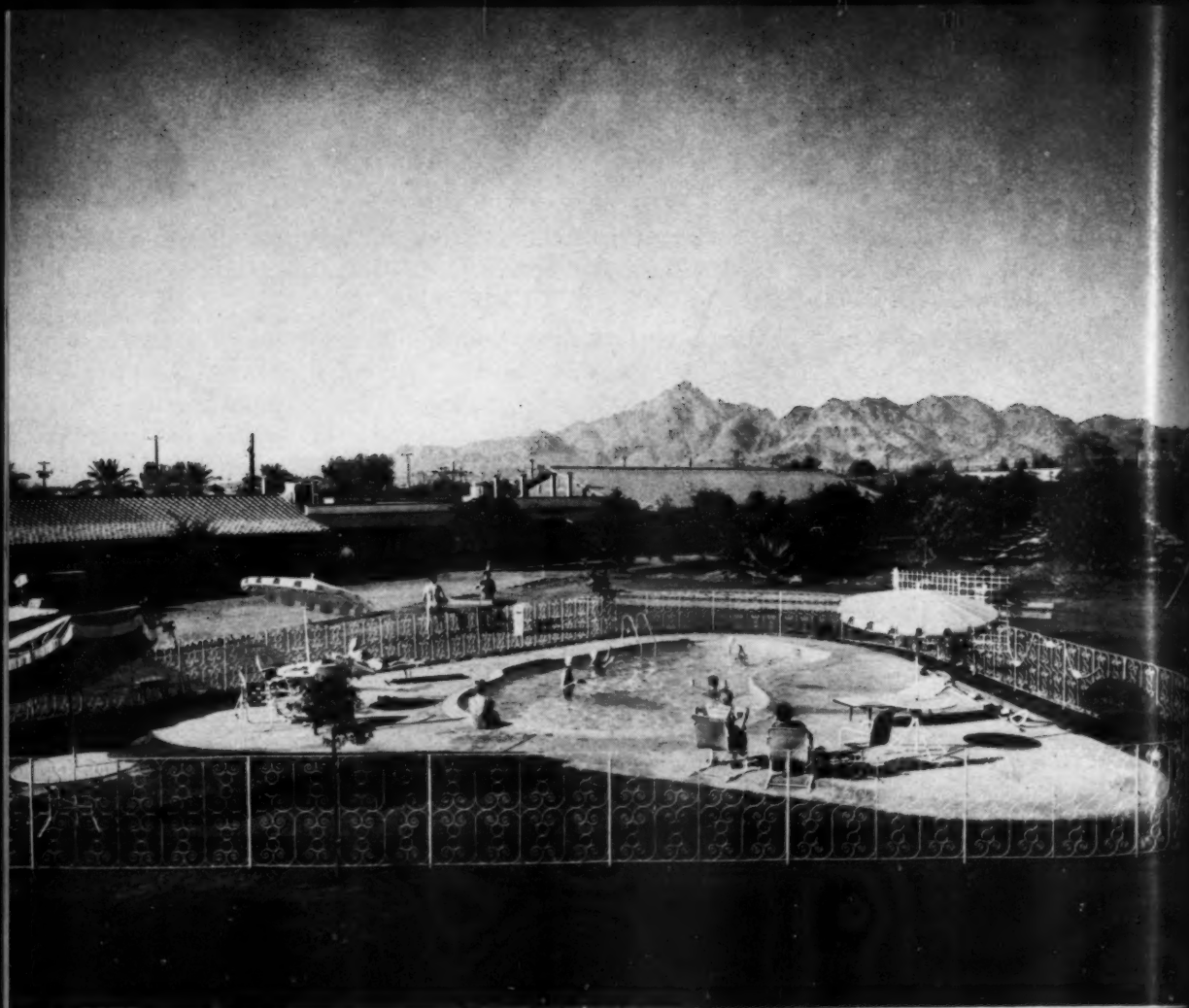
How Supplied

Each Trancoprin tablet contains 300 mg. (5 grains) of acetylsalicylic acid and 50 mg. of chlormezanone [Trancopal® brand]. Bottles of 100 and 1000.

Trancoprin Tablets / non-narcotic analgesic

References: 1. DeNyse, D. L.: *M. Times* 87:1512, Nov., 1959. 2. Ganz, S. E.: *J. Indiana M. A.* 52:1134, July, 1959. 3. Gruenberg, Friedrich: *Current Therap. Res.* 2:1, Jan., 1960. 4. Kearney, R. D.: *Current Therap. Res.* 2:127, April, 1960. 5. Lichtman, A. L.: *Kentucky Acad. Gen. Pract. J.* 4:28, Oct., 1958. 6. Mullin, W. G., and Epifano, Leonard: *Am. Pract. & Digest Treat.* 10:1743, Oct., 1959. 7. Shansaphy, J. F.: *Current Therap. Res.* 1:59, Oct., 1959. 8. Collective Study, Department of Medical Research, Winthrop Laboratories. 9. Hergesheimer, L. H.: An evaluation of a muscle relaxant (Trancopal) alone and with aspirin (Trancoprin) in an industrial medical practice, to be submitted.

Winthrop LABORATORIES, New York 18, N. Y.



This beautiful, heated swimming pool highlights the spacious lawn and recreation area at Camelback Hospital. Other outdoor activities include volley ball, ping pong, shuffleboard and badminton, all under the supervision of a trained therapist. Those preferring restful relaxation may enjoy a quiet conversation in the beautiful lawn and grove area with its scenic mountain backdrop.

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5055 North 34th Street

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OTTO L. BENDHEIM, M.D., F.A.P.A., MEDICAL DIRECTOR



Located in the heart of the beautiful Phoenix citrus area near picturesque Camelback Mountain, the hospital is dedicated exclusively to the treatment of psychiatric and psychosomatic disorders, including alcoholism.

resistant
staphylococci
among
outpatients
emerge
less
frequently...
disappear
more
readily

CHLOROMYCETIN[®]

chloramphenicol, Parke-Davis

IN VITRO SENSITIVITY OF COAGULASE-POSITIVE STAPHYLOCOCCI TO CHLOROMYCETIN FROM 1955 TO 1959*

1955	96%
1956	100%
1957	96%
1958	95%
1959	95%

These sensitivity tests were done by the disc method on 310 strains of coagulase-positive staphylococci. Strains were isolated from patients seen in the emergency room. It should be noted that among inpatients, resistant strains were considerably more prevalent.

*Adapted from Bauer, A. W.; Perry, D. M., & Kirby, W. M. M.: J.A.M.A. 173:475, 1960.

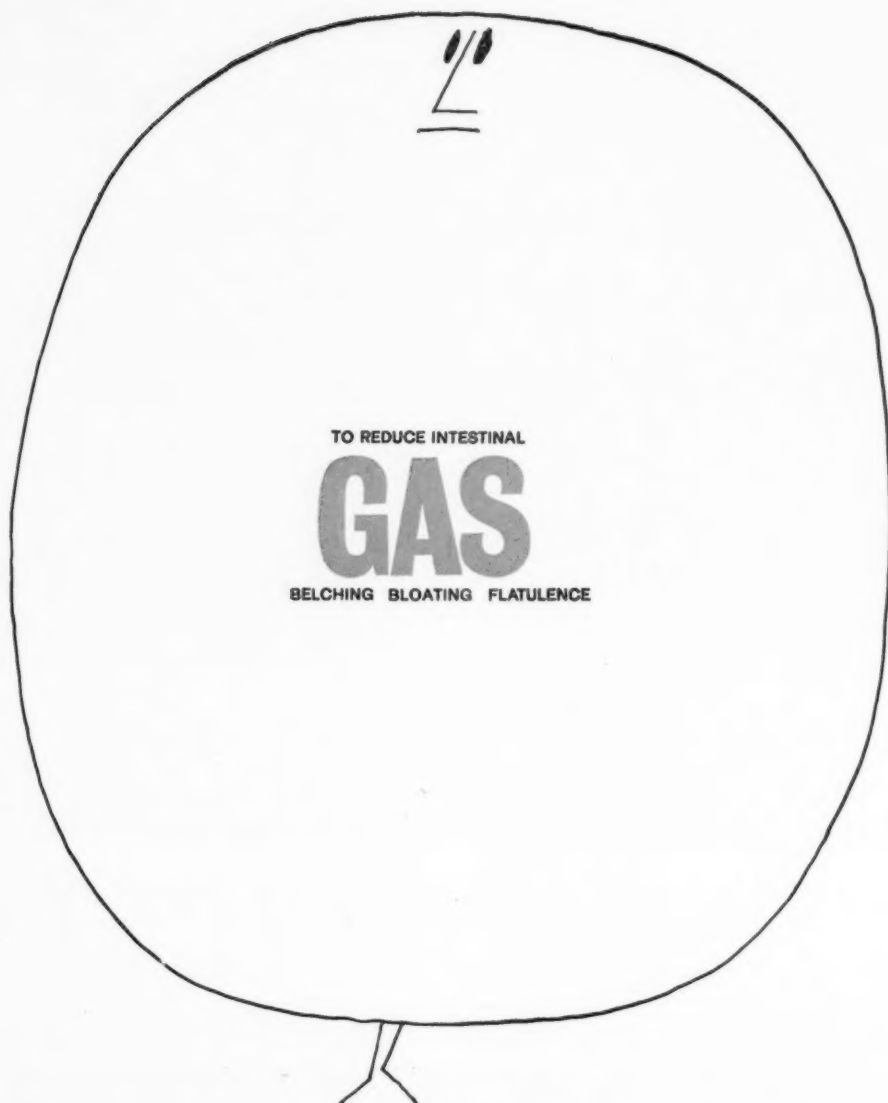
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CHLOROMYCETIN (chloramphenicol, Parke-Davis) is available in various forms, including Kapseals[®] of 250 mg., in bottles of 16 and 100.

CHLOROMYCETIN is a potent therapeutic agent and, because certain blood dyscrasias have been associated with its administration, it should not be used indiscriminately or for minor infections. Furthermore, as with certain other drugs, adequate blood studies should be made when the patient requires prolonged or intermittent therapy.

PARKE-DAVIS

PARKE, DAVIS & COMPANY • DETROIT 32 MICHIGAN



A biochemical compound used to diminish intestinal gas in healthy persons and those patients having digestive disorders ■

KANULASE

Each Kanulase tablet contains Dorase,* 320 units, combined with pepsin, N.F., 150 mg.; glutamic acid HCl, 200 mg.; pancreatin, N.F., 500mg.; oxbile extract, 100 mg. Dosage: 1 or 2 tablets at mealtime. Supplied: Bottles of 50 tablets.

DORSEY BRAND OF CELLULOSE, EXPRESSED AS DIGESTIVE ACTIVITY UNITS.
SMITH-DORSEY • a division of The Wander Company • Lincoln, Nebraska



roll this
MOBILE
electrocardiograph
wherever
it's needed


MODEL 100M MOBILE VISO-CARDIETTE

\$895 delivered,
Continental U.S.A.

THIS IS THE NEWEST Sanborn electrocardiograph — complete with all accessories in a fully mobile, easy-to-roll cabinet version. A single Model 100M "Mobile Viso" can easily serve several locations within a clinic or hospital, and perfectly answers the need for instrument storage away from the point of use. The highly developed design of this modern instrument also provides fully diagnostic cardiograms at either of two chart speeds (25 and 50 mm/sec), sensitivity settings of $\frac{1}{2}$, 1 or 2 times normal, fully automatic stylus stabilization during lead switching, pushbutton grounding, jacks for recording and monitoring non-

ECG inputs in conjunction with other equipment. The cabinet is available in either handsome mahogany or exceptionally durable, stain-resistant plastic laminate.

The same basic instrument — with identical circuitry — is also manufactured as a desk-top instrument, designated Model 100 Viso-Cardiette. A third choice in Sanborn ECG'S is also offered, for the physician whose practice demands maximum portability: the 18-pound "briefcase" size Model 300 Visette. All are proven Sanborn electrocardiographs, reflecting more than four decades of experience in the manufacture of medical instrumentation.

MEDICAL  DIVISION

SANBORN COMPANY

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In over five years

Proven

in more than 750 published clinical studies

Effective

for relief of anxiety and tension

Outstandingly Safe

- 1 simple dosage schedule produces rapid, reliable tranquilization without unpredictable excitation
- 2 no cumulative effects, thus no need for difficult dosage readjustments
- 3 does not produce ataxia, change in appetite or libido
- 4 does not produce depression, Parkinson-like symptoms, jaundice or agranulocytosis
- 5 does not impair mental efficiency or normal behavior

Miltown®

meprobamate (Wallace)

Usual dosage: One or two 400 mg. tablets t.i.d.

Supplied: 400 mg. scored tablets, 200 mg. sugar-coated tablets.

Also as MEPROTABS®—400 mg. unmarked, coated tablets; and
as MEPROSPAN®—400 mg. and 200 mg. continuous release capsules.



WALLACE LABORATORIES / Cranbury, N. J.

of clinical use...



...for the tense and nervous patient

Despite the introduction in recent years of "new and different" tranquilizers, Miltown continues, quietly and steadfastly, to gain in acceptance. Meproamate (Miltown) is prescribed by the medical profession more than any other tranquilizer in the world.

The reasons are not hard to find. Miltown is a *known* drug. Its few side effects have been fully reported. *There are no surprises in store for either the patient or the physician.*

NEW analgesic

Kills pain



n stops tension

For neuralgias, dysmenorrhea, upper respiratory distress, postsurgical conditions...new compound kills pain, stops tension, reduces fever—gives more complete relief than other analgesics.

Soma Compound is an entirely new, totally different analgesic combination that contains three drugs. First, Soma: a new type of analgesic that has proved to be highly effective in relieving both pain and tension.* Second, phenacetin: a "standard" analgesic and antipyretic. Third,

caffeine: a safe, mild stimulant for elevation of mood. As a result, the patient gets more complete relief than he does with other analgesics.

Soma Compound is nonnarcotic and nonaddicting. It reduces pain perception without impairing the natural defense reflexes.*

NEW NONNARCOTIC ANALGESIC

soma[®] Compound

Composition: Soma (carisoprodol), 200 mg.; phenacetin, 160 mg.; caffeine, 32 mg.
Dosage: 1 or 2 tablets q.i.d.
Supplied: Bottles of 50 apricot-colored, scored tablets.

NEW FOR MORE SEVERE PAIN

soma[®] Compound + codeine


BOOSTS THE EFFECTIVENESS OF CODEINE: Soma Compound boosts the effectiveness of codeine. Therefore, only $\frac{1}{4}$ grain of codeine phosphate is supplied to relieve the more severe pain that usually requires $\frac{1}{2}$ grain.

Composition: Same as Soma Compound plus $\frac{1}{4}$ grain codeine phosphate.

Dosage: 1 or 2 tablets q.i.d.

Supplied: Bottles of 50 white, lozenge-shaped tablets; subject to Federal Narcotics Regulations.

**References available on request.*

 WALLACE LABORATORIES • Cranbury, N. J.

WINE...



Now widely prescribed for the chronic
invalid, the convalescent,
the debilitated oldster

Physicians treating the aged and the convalescent have for generations been aware of the restorative power of wine. However, it remained for recent research* to more clearly define its clinical physiological action.

Wine Increases Appetite—Goetzl and co-workers¹ observed a profound stimulating effect on olfactory acuity and appetite, even in anorexia.

Wine Aids Gastric Digestion—Ogden and Southard² reported a significant increase in gastric secretion following ingestion of moderate amounts of table wine.

Wine Helps in Cardiology—Prudent quantities of wine are helpful³ in counteracting depression, anxiety and discomfort in sufferers from heart and coronary disorders.

*Wine—"safest of all sedatives..."*⁴—A little Port or Sherry at bedtime offers a valuable relaxant to the insomniac and may obviate the need for drug-sedative medication.

In brief, wine taken with discretion adds greatly to the pleasures of the table, to physical comfort and to mental serenity in the aged, as well as in the chronic sufferer and the convalescent.

Research information on wine is available on request. Write for your copy of **"Uses of Wine in Medical Practice."* Wine Advisory Board, 717 Market Street, San Francisco 3, California.

1. Goetzl, F.R.: *Permanente Found. M.Bull.* 8:72 (April) 1950.

2. Ogden, E., and Southard, F.D., Jr.: *Fed. Proceedings* 5:77 (1946)

3. Brooks, H.: *Med. J. & Rec.* 127:199 (1928)

4. Haggard, H.W., and Jellinek, E.M.: *Alcohol Explored*, New York, Doubleday, Doran, 1942.



"Well, I'll send the culture to the lab, and we should hear from Bacteriology in a day or two. Now, how shall we treat her cystitis while we're waiting?"

"The chief usually orders AZOTREX. The azo dye is an excellent urinary analgesic and the sulfamethizole and tetracycline are likely to take care of most of the bugs you find in the urinary tract. If necessary, you can switch to something else after you get the lab findings. But it probably won't be necessary."



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Diet or Drugs?

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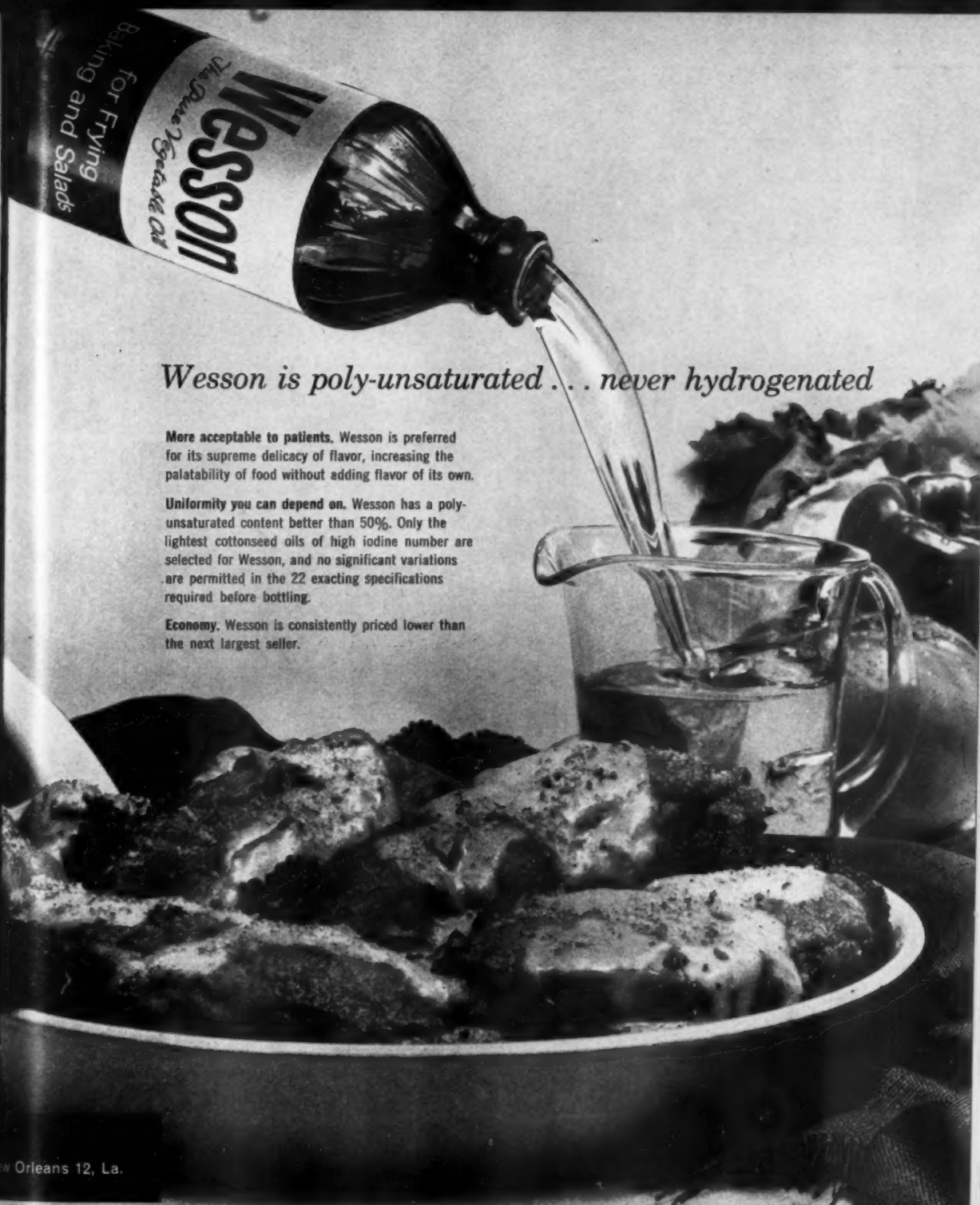
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Wednesday, January 18, 1961
The White Fence Farm

CINCINNATI, OHIO

Sunday, January 22, 1961
The Netherland Hilton Hotel

NEW DORP, STATEN IS., N. Y.

Wednesday, February 15, 1961
The Tavern-on-the-Green

CHARLESTON, SOUTH CAROLINA

Thursday, February 23, 1961
The Francis-Marion Hotel

ANCHORAGE, ALASKA

Saturday, February 25, 1961
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Friday, March 3, 1961
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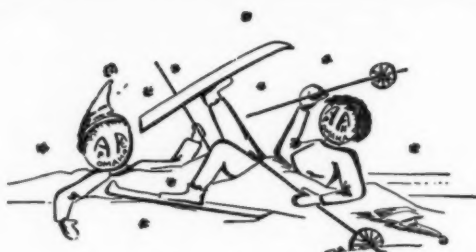
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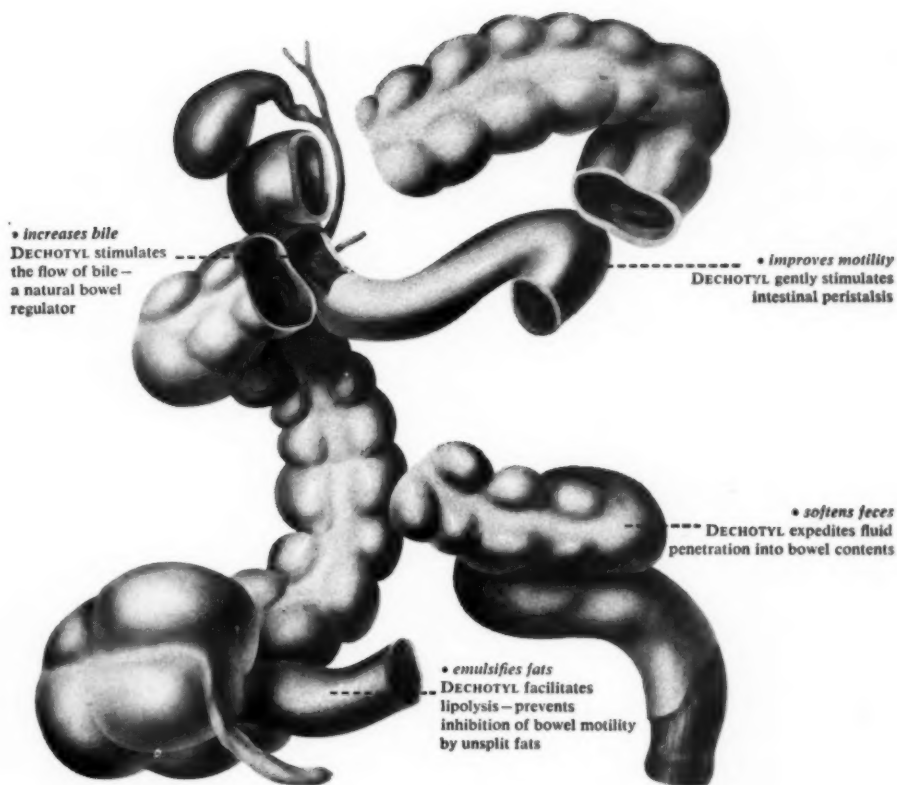
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